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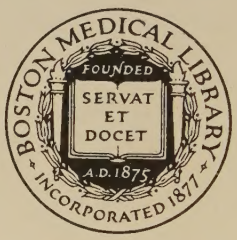

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THE DISEASES OF CHILDREN

AND THEIR

HOMEOPATHIC TREATMENT.

A Text-Book for Students, Colleges, and Practitioners.

BY

ROBERT N. TOOKER, M.D.,

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CHICAGO

GROSS AND DELBRIDGE

No. 48 MADISON STREET

1895

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" 26 " " " " " continued
Nov. 2 Feeding continued
" 9. Diseases & cond. of newly born
" 16 - Rachitis
" 23 - Marasmus

TO

MARIA M. GROSS, M. D.

WHO WAS AMONG THE FIRST OF HER SEX TO
DEMONSTRATE WOMAN'S FITNESS
FOR THE STUDY AND PRACTICE OF MEDICINE, AND WHOSE
ADVICE AND COUNSEL
HAVE OFTEN BEEN OF GREAT VALUE TO THE WRITER
IN CRITICAL CASES, THIS
WORK IS AFFECTIONATELY DEDICATED BY
HER BROTHER,

THE AUTHOR.

PREFACE.

THE need of a new and comprehensive treatise on Pediatrics, adapted to the wants of students and practitioners of the Homeopathic School of Medicine, has long been recognized. The literature of the older school is replete with manuals of the highest order, and cyclopedias of rare merit; but our own is almost barren in this direction. In every other branch of medicine and surgery, our authors have been numerous and prolific.

In Pediatrics alone, are we behind our confreres. This state of affairs cannot be explained on the ground of indifference, or in any way satisfactorily, except that our many able writers in this specialty, have each been waiting for the other to take the initiative and assume the burden and responsibility of authorship. The writer began the preparation of the present volume more than five years ago, but its progress was suspended for several years, owing to current rumors that others quite as capable were actively engaged in a similar undertaking. As these rumors failed to materialize, the demand for a new book on the diseases of children and their homeopathic treatment, became imperative, and the work was resumed.

The labor involved in the preparation of an acceptable treatise, covering the entire field of Pedology, seemed, at first, to be prohibitory, in the midst of a busy every-day practice, and the exacting duties of college work; but the enthusiastic proffers of aid from so many professional friends, who had already become widely known as authors and teachers, gave all needed encouragement, and the work has, with their help, been carried to completion in a most agreeable manner. The author's thanks are hereby given to Prof. L. C. Grosvenor, for his chapter on the Sanitation of the Nursery; to Prof. J. H. Buffum, for the chapters on the Eye and Ear; to Prof. E. M. Hale—Affections

of the Heart; and to Prof. Clifford Mitchell, for his admirable contribution on the Disorders of the Urinary Tract.

Thanks are also due to Profs. N. B. Delamater and S. N. Schneider for the section on Nervous diseases.

Finally, the author desires to express his obligations to the numerous writers of both schools of medicine, whose contributions to the literature of this subject have been constantly consulted, and at times freely drawn upon, due credit being given in the text as called for.

The diseases of children are practically the same the world over, and they have been so often, so accurately, and exhaustively described, that a distinctively original work on Pedology is scarcely possible.

The aim of the writer has been, not so much to improve on, or vary the descriptions of, disease phenomena, affecting infants and children, as set forth in other and standard treatises; nor to add to, or find fault with, accepted theories of etiology and pathology, but rather to condense our present knowledge, opinions, and theories, and gather together the best therapeutic and hygienic measures for the relief of infantile maladies.

That portion of the work for which the writer is more especially responsible, is the outgrowth of thirty years' experience as a medical practitioner, more than half of which period has been spent as a teacher of Pediatrics. It is not presumption, therefore, to hope that the volume will be found not without merit, and that it will be acceptable and helpful to the medical student, and a welcome accession to the working library of the busy doctor.

R. N. T.

CHICAGO, NOVEMBER 1, 1894.

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THE DISEASES OF CHILDREN.

PART I.

CHAPTER I.

INTRODUCTORY.

THE period of "infancy," when used in a medical sense, is understood as covering the time from birth to the completion of first dentition, which occurs as a rule when the child is about two and a half years of age.

Childhood covers the period from infancy to puberty, which in this country is reached at an age of twelve to fourteen. When taken together they constitute an epoch in human life which is fraught with absorbing interest. Until within the last thirty years no American medical college had paid any special attention to the diseases peculiar to childhood; no children's clinics were held, and all that the medical student could learn about them was to be found in the text-books and didactic lectures on general practice. Now, however, all of our principal medical colleges have a special chair of pedology; special children's clinics are deemed as necessary as any other, and numerous large and comprehensive treatises devoted to this subject are among the most highly prized volumes in every intelligent physician's medical library.

It is not at all strange that this should be so. The period referred to is essentially different in every aspect from adult-life. The anatomy, the physiology, the pathology and the therapeutics of infancy are all sufficiently different to require special study and special knowledge for their proper understanding. That adults occasionally and exceptionally have diseases that as a rule are found only among children, does not militate against this statement.

One might practice medicine for a lifetime among adults without meeting a typical case of measles, or scarlet fever, or diphtheria, nor would he know anything about the aberrations

of development. Under such circumstances he surely could know nothing about the peculiarities of the infantile stomach, or the idiosyncrasies of the undeveloped nervous system. Even if he had practiced for years among the deaf and dumb he would be sorely puzzled to interpret aright, at the first encounter, the disease language of infancy.

And yet to one who has carefully studied the habits and characteristics of infants, the absence of articular speech is no barrier usually to a correct diagnosis; and the careful observer can often tell at a glance by features, attitude or behavior all that language could convey of the seat and nature of the ailment. In some respects the diagnostician is aided by the dumbness of his patient. If there is no speech, so also there is no prevarication nor dissimulation. The infant does not, intentionally or otherwise, place undue stress on trifling symptoms which might conceal or obscure a real and serious malady. In pulmonary complaints the absence of visible sputa is not a serious loss, for other signs are present and available to make it easy to estimate the true condition of affairs. The same is true of the urine. Indeed, I fancy that with the exercise of a due amount of patience, the skillful physician will make fewer mistakes in diagnosing the ills of infancy than in an equal number of those maladies more commonly met with in adults, however intelligent and voluble they may be. To point out and elaborate in detail all of the differences between child-life and adult-life would require a volume larger than this and would then be more curious and interesting than useful.

There is scarcely an organ or a tissue that behaves precisely alike in the two epochs. In maturity there is, until old age begins, a daily balance between waste and repair. There is no increase in growth, or material change in organ or function. Childhood, however, is a period of rapid change—of growth and development.

Some of the organs, such as the reproductive, whose offices are to cut an important figure later on, are now dormant and inactive. Others having done important work during embryonic life are ceasing their activity and undergoing a more or less rapid process of absorption—atrophy.

Anatomical Peculiarities of Infancy.—In a general way it may be said that at birth the bones are more elastic and less firm; they contain more animal and less earthy matter than in advanced years; they are more cartilaginous, and their growth is more from cartilage than periosteum. Certain aberrations of ossification are now noticeable in certain cases which

may destroy the symmetry of normal growth or prejudice the life of the child. The skull, which is intended to support the brain and its blood vessels, may prevent their due development, while an insufficient degree of ossification or an undue amount of sutural substance may conduce to an enlargement of the blood vessels and consequent effusion. The separate bones of the skull are but loosely articulated at first, but at a variable period the sutures are ultimately obliterated. The yielding nature of the skull at this time is such that it may be indented by a blow, or compressed by a bandage, or its shape may even be altered by the weight of the contained brain, if the infant is allowed to lie habitually on one side.

The fontanels are two irregular but somewhat triangular openings with membranous coverings at the angles of the parietal bones. The anterior and larger one of the two fontanels is situate at the junction of the parietal and frontal bones, or more correctly speaking, at the junction of the coronal and sagital sutures; the posterior, at the junction of the parietal and occipital bones. As a rule, these fontanels are larger at six months of age than they are at birth, the reason being that the growth and expansion of the brain within the calvaria goes on more rapidly than the process of ossification. The latter, however, soon overtakes the former and both fontanels should be closed before the end of the second year. They are often closed much earlier than this—as soon, indeed, as the fifteenth or sixteenth month. When remaining unclosed into the third year, the fact has a significance that will appear when we come to speak of rickets.

During infancy and childhood the jaw and the teeth are in a rudimentary state, and their lack of development makes the facial portion of the skull look disproportionately small. The upper and lower maxillary bones undergo various modifications until both the temporary and permanent teeth are completed, and indeed do not reach their fixed and ultimate form until the age of puberty. The evolution of the teeth and the progressive stages leading thereto will be treated of later on under the head of teething.

The vertebral column is straighter and the insertion of the ribs more rectangular at their insertion at the transverse processes of the vertebra and the sternum. This renders respiration more abdominal than costal and the viscera of the abdominal cavity appear more prominent.

The nervous system in infancy probably shows greater differences relatively than any other portion of the anatomy. The brain at birth is very large. Its weight is one-sixth of the entire weight of the body, while in the adult it is one-sixtieth.

The brain substance is soft and pasty and less distinctly separated into medullary and cineritious matter; indeed, its gray and white substances differ but little in color and composition. The convolutions are less prominent and less numerous. The nerves of special sense are fully developed, but are inactive. The nerves of organic life—the sympathetic—are quite proportionate to age and development.

The spinal cord, like the brain, has not yet the consistency of a later period. The anterior horns are unduly prominent and are therefore especially sensitive to pathological changes. The peripheral nerves are relatively large, but lack the excitability they have later. Toward the end of the first year, however, this excitability grows rapidly; much more so than that of the inhibitory nerves. During the first month of extra-uterine life, all muscular movements are not controlled by will-power at all, but are purely reflex. After this time, however, the brain develops very fast indeed, although the development is by no means uniform. Certain cerebral functions spring into existence one after another, coincident with other anatomical evolutions.

The lymphatic system is remarkably well developed in infancy, comparatively speaking. So also is the glandular. The liver is one of the first formed organs in the embryo and at the fourth week of embryonic life it occupies nearly the whole abdominal cavity, and constitutes one-half the entire weight of the body. From this time, however, it diminishes in bulk until birth, when it occupies nearly the upper half of the abdomen, and its proportional weight to that of the body is as one to eighteen. During infancy and early childhood its position is such that its lower margin can be felt about half an inch below the costal cartilages. In the middle line the liver is in close relation to the skin in front of the stomach and reaches about half way between the ensiform cartilage and the umbilicus. Here its lower edge corresponds to a line drawn from the ninth right to the eighth left costal cartilage.

The thymus gland is situated just behind the top of the sternum, extending when fully developed, at the end of the second year, into the root of the neck over the trachea and separated from the great vessels by the thoracic fascia. It rests below upon the pericardium, just above the point where the pleura approach each other. After the second year it diminishes until it entirely disappears or is substituted by a mass of fat. It is of a pinkish gray color and lobulated, and at birth weighs half an ounce. Its disappearance takes place often at the age of puberty and sometimes not until after middle life is reached.—*McLellan.*

The stomach in infancy presents some peculiarities which are worthy of mention. The most noticeable of these is the vertical position which it occupies in the abdomen. In the new born it presents more the appearance of a simple enlargement or expansion of the esophagus. Its fundus is wanting and it does not have the larger and smaller curves. The valvular construction of the cardiac orifice is deficient in infants, which accounts for the facility with which they vomit when the viscus is from any cause over distended.

The circulatory system of the newly born, except during the first few days, shows but little change from that of the adult, except that the veins are relatively small while the arteries are relatively large. Shortly before birth the heart loses those peculiarities which distinguish the fetal heart and the organ rapidly assumes its normal condition for life. The changes which take place in the circulation of the blood at this time are remarkable. The umbilical vein and the ductus venosus become empty and contract and are ultimately converted into the fibrous cords which become the round ligament of the liver. But, as Holden says, "It is well to bear in mind that these important vascular changes do not take place suddenly at birth, but that they are the result of gradual development which is completed at or soon after birth, mainly by the act of inspiration, whereby the blood passes through the lungs, the placental circulation at the same time being interrupted."

PHYSIOLOGICAL PECULIARITIES.—Comparing infancy with mature age, there is a similar difference to be noted in the physiology as well as in the anatomy of the organism. To be sure, all of the vegetative functions, those which are essential to life, are performed, but most of them are but feebly carried on and these are easily disturbed by trifling causes. The skin of the new born, when cleansed of its sebaceous matter and its vernix caseosa, is found to be much more red and sensitive than in later life, and during the first few weeks after birth there is usually more or less desquamation. There is but little perspiration, but the sebaceous glands are very active, especially on the scalp. Unless this sebaceous matter is constantly cleansed away, infantile eczema is very prone to result. During the first three or four months there is no secretion of tears. The new born and the dying do not weep. After the first three or four months, the absence of tears is not a good sign. It has been found that the blood of infants is less in proportion to weight of the entire body than in adult life; and this blood has "less fibrin, fewer salts, less hemaglobulin, less soluble albumen, less

specific gravity and more white corpuscles than the blood of advanced age."

The pulse of infants and children is very irritable and easily influenced by slight, even physiological, causes. It is also very irregular in rhythm, owing to the variability and instability of the nerve supply. Indeed, the pulse in infancy is so easily perturbed that it loses, when considered alone by itself, much of its usual pathological significance.

The normal frequency of the pulse at birth is 140 and during the first few weeks of life may fluctuate between 150 and 120, being rather more frequent in females and in smaller infants. At the end of the first year the rate varies from 100 to 120. After this the pulse beats about 100 and gradually becomes less frequent until at five years the normal frequency is generally about 90.

The respiratory function is subject to the same variableness as the pulse. During the first few months it is no uncommon thing to find a veritable Cheyne-Stokes rhythm, which is either normal or occasioned by causes so trivial as scarcely to be considered as pathological. At birth the number of respirations per minute varies from 30 to 50, the mean between these figures being the average. They are fewer during sleep and are then also more regular. During the first year of life the respirations range between 25 and 35, but these figures are increased by crying or laughing and diminished by fixing the infant's attention. Von Pettenkofer has estimated that a child produces in proportion to its body-weight nearly three times as much carbonic acid as an adult.

TEMPERATURE.—The clinical thermometer is of the greatest value in the treament of the diseases of infancy and cannot safely be dispensed with. The feeling of the skin is very deceptive. The hand may detect no fever at all when the internal temperature may be raised several degrees above the normal. It is one of the peculiarities of infancy that very slight and transient causes produce a sudden elevation of the temperature, although, as a rule, in a healthy child the thermometer shows a fairly constant mean of 99° in the rectum. It rises a half-degree or so after a hearty meal, but there is no marked difference in health between the morning and evening.

On account of the excitability of the nervous system which has already been referred to, children are very subject to what may be called "irritative fever," *i. e.*, a form of pyrexia which results from any trifling cause that frets or worries it.

Dentition is a frequent promoter of this form of febrile excitement and so is irritation of the bowels by scybala, food

injested that does not quite agree and intestinal worms. This irritative fever of which we are speaking is always marked with great irregularity. There is no regular evening exacerbation or morning remission as in most other forms of pyrexia.

Sometimes, instead of an elevation, the thermometer shows a marked lowering of the temperature. This is usually a sign of malnutrition. Anything which exhausts the system, like chronic vomiting or purging, is likely to be followed by a fall in temperature. In convalescence from acute diseases, the temperature may remain for days or even weeks at a lower level than that of health. Dr. Eustace Smith has observed that children who are growing rapidly are subject to a nightly rise in temperature, the thermometer sometimes ranging as high as 100° or 100.6°. Under these circumstances, this phenomenon is physiological and not pathological in its nature. In infants the temperature should always be taken in the rectum. Here the thermometer can always be used safely and an accurate registry secured. This cannot be said of the axilla or the groin.

GROWTH.—The average weight of a healthy infant at birth is seven pounds, the female being somewhat less heavy. This weight is about doubled at five months, and trebled at the end of the first year of life.

The average length of a child at birth is 19·5 inches, and the subjoined table of the monthly rate of increase is given by Louis Starr.

Birth	19·5	inches
1 month	20·5	"
2 months	21	"
3 months	22	"
4 months	23	"
5 months	23·5	"
6 months	24	"
7 months	24·5	"
8 months	25	"
9 months	25·5	"
10 months	26	"
11 months	26·5	"
12 months	27	"

"During the second year the increase is from three to five inches; in the third from two to three and a half inches; in the fourth from two to three inches."

The gain in weight per annum for the first few years averages four or five pounds.

For five years and onwards the figures both for height and weight have been worked out by Dr. G. W. Stephenson, whose table is subjoined.

AVERAGES OF HEIGHT AND WEIGHT OF BOYS AND GIRLS OF ENGLISH SPEAKING RACES, CALCULATED FROM THE TOTAL OF BRITISH AND AMERICAN STATISTICS.

BOYS.

Age.	Height in inches.	Weight in pounds.
5	41·30	40·49
6	43·88	44·79
7	45·86	49·39
8	47·41	54·41
9	49·69	59·82
10	51·76	66·40
11	53·47	71·09
12	55·05	76·81
13	57·06	83·72
14	59·60	93·46
15	62·27	104·90
16	64·66	120·00
17	66·20	129·19
18	66·81	134·97

GIRLS.

Age.	Height in inches.	Weight in pounds.
5	41·05	39·63
6	42·99	42·84
7	44·98	47·08
8	47·09	52·12
9	49·05	56·28
10	51·19	62·17
11	53·26	68·47
12	55·77	77·35
13	57·96	87·82
14	59·87	97·56
15	61·01	105·44
16	61·67	112·36
17	62·22	115·21
18	62·19	116·43

Dr. H. Parker, Resident Physician of the New York Infant Asylum, weighed immediately after birth 170 infants—89 males and 81 females—born consecutively and at term, with the following result:

Average male weight.....7 lbs. 11 oz.
Average female weight.....7 lbs. 4 oz.

Fifty of these who were wet-nursed and apparently well taken care of, were weighed when one week old, with the following result:

Increase of weight in.....32 cases
Loss of weight in.....13 cases
Average gain..... $4\frac{8}{10}$ oz.
Average loss ..... $3\frac{1}{2}$ oz.
Greatest gain.....12 oz.
Greatest loss ..... 6 oz.

AVERAGE GAIN.

From birth to age of four months (25 cases)..4 lbs. $8\frac{3}{4}$ oz.
From 3 to 6 months (6 cases) .....3 lbs. $3\frac{1}{8}$ oz.
From 6 to 9 months (6 cases) .....2 lbs. $7\frac{1}{8}$ oz.
From 9 to 12 months (6 cases) .....1 lbs. $15\frac{1}{2}$ oz.

This would indicate that American-born babies were somewhat heavier than the average of English-speaking races, according to Stephenson's tables.

PATHOLOGICAL PECULIARITIES.—Most of the observations and deductions that would properly come under this head will be spoken of when the diseases are described which would illustrate them. A few of these peculiarities, however, may be mentioned here, since they are of a general nature and are more incidental to the time of life than to any peculiarity of the disease itself. The peculiarities referred to often invest the commonest forms of illness with strange features which may be a source of obscurity and confusion. A functional derangement which in the adult would give rise only to slight local symptoms, may in the child be accompanied by signs of some general distress and the presence of local suffering may be thus overshadowed or completely concealed.

The swallowing of a small portion of indigestible food may throw the child into a burning fever, with intense agitation and restlessness, or it may cause convulsions or stupor from which it can with difficulty be aroused. I once knew a child of my friend Dr. S. P. Hedges, of this city—a child some two years old—to have convulsions at frequent intervals all one day from eating some partially cooked mashed potatoes. As soon as the offending substance was expelled from the system the convulsions ceased and the child resumed its play as well as ever. Indeed, it may be stated that an eclamptic attack in a child is a symptom which, in the majority of cases, has far less significance than a similar attack would have in an adult. In the latter it is usually the evidence of some serious cerebral lesion and its occurrence excites quite naturally the greatest alarm. In the child, however, a "fit" is commonly the evidence only of some disturbance in the nervous system, the amount of actual disturbance and the symptoms being very disproportionate. It may be only a trifling irritant of the most transient nature, and of no gravity whatever. In the beginning of acute illnesses, such as the eruptive fevers, we often have spasms at the outset, taking the place of the rigor so common a symptom in the beginning of febrile disease in the adult. It is not to be understood, however, that convulsions in the child are always of this innocent character. They may and do occur as a consequence of cerebral disease, but in such cases are frequently repeated or are prolonged and are succeeded by coma, rigidity, paralysis or other signs of centric irritation. Vomiting, which in the adult is often indicative of grave gastric or other organic disease, is in children a symptom of the most trifling import usually, and means or may mean only an overloaded stomach. "As profound a disturbance may be excited by the simplest functional derangement as by the severest organic malady, so that, to the eye accustomed to the orderly progress of disease in the adult,

symptoms seem to have lost their value and to be calculated rather to mislead than to inform."

Children sometimes suffer the most violent nocturnal delirium—the so-called "night terrors"—from slight derangement of the stomach from worms or otherwise.

Another peculiarity of infants is the fact that they quickly part with their heat and are easily chilled. They are therefore especially prone to catarrhal affections, which may seriously interfere with the functions of the organ involved, and this arrest of function may of itself lead to fatal results; and a child may die with tissues sound, organs healthy and no morbid appearances left to declare the nature of the complaint. Post-mortem examinations have been made of children dead from marasmus, in whom not the slightest trace of organic disease has been discoverable.

The gravity of certain, indeed it may be said of all, diseases is modified either one way or another by age. Typhoid fever, measles, and perhaps croupous pneumonia generally run a milder course in earlier than they do in later life; but others, such as acute affections of the gastro-intestinal tract, are far the more severe in comparison with the youth of the patient. The infant is so dependent upon a frequent supply of nourishment, that any abrupt interference with the nutritive processes is an event of the utmost gravity. It is often followed by so much exhaustion that the infant rapidly sinks and dies. It is this sudden and complete cutting off of the nutritive supply which constitutes the chief danger of acute disease, and all through early life illness is often serious in exact proportion to the degree in which the alimentary canal participates in the derangement. When children retain their ability to eat and digest, while passing through an acute illness, their recovery is generally assured and their convalescence rapid. In uncomplicated cases the strength appears to be recovered almost as quickly as it was lost. When, in such cases, convalescence is delayed it is almost invariably due to a complication, a thing which is far from being uncommon.

From chronic maladies convalescence is usually slow, the delay being no doubt partly due to the fact that this class of diseases is more common in children of a scrofulous habit and the strumous cachexia, as is well known, is in itself a barrier to rapid improvement. Another reason for this tardiness in recovery is found in the fact that in children chronic ailments nearly always, in the course of their progress, sooner or later affect the alimentary canal and such complaints are invariably slow.

When sudden death occurs to a child previously healthy, or

at least to all appearances so, it is usually due to laryngismus, to syncope, or to collapse of the lung. Occasionally, although not frequently, it is a consequence of convulsions. Pulmonary collapse is frequently met with in infants or children who have been greatly enfeebled by some wasting disease. A fatal termination of disease is usually marked by a sudden alteration of the temperature, either dropping below the normal or rising quickly to 108° or 109°. The former is more apt to be the case in chronic diseases or in collapse of the lung, the latter in cerebral cases or gastro-intestinal derangements.

SIGNS OF DISEASE.—"The clear, fresh complexion of a healthy baby or a young child is familiar to everyone. A loss of its purity and clearness is one of the first indications of digestive derangement. The face becomes muddy-looking and the upper lip whitish or bluish. Blueness of the upper lip in early life is a common sign of labored digestion. In some children difficult digestion is shown by an earthy tint of the face which spreads to the forehead. It appears a short time after the meal and may last several hours. In chronic bowel complaints the earthy tint is constant. It is common in cases of chronic diarrhea in the infant, and if at the same time there is much emaciation, the derangement is likely to prove obstinate. In syphilis the prominent parts of the face—the nose, cheeks, chin and forehead—assume a swarthy hue. In lardaceous disease the complexion is peculiarly pallid and bloodless; in rickety children whose spleens are greatly enlarged it has a greenish or faint olive cast; and in cyanosis the face has a characteristic leaden tint, the conjunctiva are congested, and the eyelids and lips thick and purple. Lividity of the skin around the mouth and nose with a purple tint of the eyelids is common as a result of deficient aëration of the blood. In severe cases the cheeks at the same time have a dull white color, and the symptom is an unfavorable one. In the spasmodic stage of whooping-cough the face looks swollen as well as livid, the lips and eyelids are purple and thick, and the conjunctiva are congested and often bloodshot.

"In addition to the actual tint of the face, the general expression must receive attention. In a healthy babe the physiognomy denotes merely sleepy content, and no lines mark the smooth, uniform surface. Pain is indicated by a contraction of the brows which wrinkles the skin of the forehead. This is especially noticeable if the head is the seat of suffering. If the pain be in the abdomen, the nose often looks sharp, the nostrils are dilated, and the child draws up the corners of the mouth with a peculiar expression of distress. In every case of

serious disease the face, even in repose, has a haggard look, which must not be disregarded. If this be accompanied by a hollowness of the cheeks and eyes the result is a ghastly expression which cannot escape attention; but a distressed look may be seen in the face, although there is no loss of roundness of feature. If this be the case, even in the absence of striking symptoms, we may confidently predict the onset of serious disease.

"Often an inspection of the face will help us to a knowledge of the part of the body affected. Many years ago M. Jadelot pointed out certain lines or furrows in the face of an ailing infant which by their position indicate the seat of the derangement, thus:

"The *occulo-zygomatic* line begins at the inner canthus of the eye, passes thence downwards and outwards beneath the lower lid and is lost on the cheek a little below the projection of the malar bone. This line points to disease or derangement of the brain and nervous system.

"The *nasal* line rises at the upper part of the ala of the nose and passes downwards, curling round the corner of the mouth. This line is a constant feature of abdominal mischief, and is never absent in cases of gastro-intestinal derangement.

"The *labial* line begins at the angle of the mouth and runs outward to be lost in the lower part of the face. This is more shallow than the preceding. It is a fairly trustworthy sign of disease in the lungs and air-passages.

"These lines have a distinct practical value and should be always attended to."—*Eustace Smith.*

The attitude of the child as he lies in his cot is not to be overlooked. It is sometimes very significant. Healthy infants and children sleep perfectly quietly. Frequent turning of the body, twitching of the muscles, jumping and starting, always indicate some derangement somewhere. It may indicate merely feverishness or digestive derangement, but it is a departure from perfect health. If the head is moved constantly from side to side on the pillow it is probably annoyed with pain in the head or ear. When the hand is frequently carried to the forehead or side of the head it usually means the same thing.

Some writers attach much importance to the cry of the child and seem to regard its character as having much significance. There is to their minds a hungry and a thirsty cry, a cry indicative of colic and another peculiar to earache. I must confess that I find in these cases that the cry is generally supplemented by other movements of the body, that to me are more significant than the cry itself. But these movements must be studied

at the bedside and each for himself. They are indescribable by words. The absence of crying is a serious omen.

All healthy children cry whenever anything causes pain or discomfort. When it does not do so, it betokens or may betoken serious disease. There is one cry, however, that is so peculiar and so significant that it deserves special mention. It is the "cri excephalique" of the French. It is sharp, shrill and solitary and is distinctive of cerebral disease.

It is very different, the very antipodes of the long-drawn moans and wails of marasmus and tubercular peritonitis.

EXAMINATION OF SICK CHILDREN.—Nearly every work upon diseases of children contains several pages of more or less explicit directions as to how the student or the young practitioner is to go to work to examine a child who is supposed to be ill, in order that he may ascertain the seat and nature of the complaint and be able to prescribe intelligently therefor.

I see but little reason for this. The printed page can never teach the novice to be an expert. The medical practitioner who essays to treat successfully the diseases of infancy must have great patience and greater tact. Both of these accomplishments may be cultivated, but they cannot be taught. Their possession is a gift rather than an acquirement, and all the written directions in the world cannot teach that which is inherently wanting. To illustrate, I find this in a volume before me: "To examine the abdominal organs at all satisfactorily, the child must lie on his back with his head and shoulders raised by a pillow. The mother or nurse should sit upon the bed by his side and the practitioner should take care that the hand he applies to the belly is warm and does not press too abruptly, so as to give pain. This part of the examination is usually submitted to without opposition if the child be humored and cheerfully talked to, etc."

This is all well and good, but why waste words and time trying to teach a man to warm his hands before putting them on the abdomen of a sick child, or try to teach him to talk good humoredly or cheerfully to a child that is howling with pain?

This cannot be taught by books. To attempt to do so is to dally with failure. The place to learn how to handle a sick child is in the medical clinic or in the nursery, where practical experience is to be had. Practice is better than precept. What the doctor needs in the chamber of a sick babe is the same kind of common sense that he needs and must have to be a welcome visitor in any sick room, be it that of man, woman or child. Hard, practical, common sense mingled with plenty of sympathy and good nature are the essential requisites of success.

No rigid rules can be laid down for the guidance of the examiner in a given case. The history of the ailment and the general history of the child should be obtained when possible from the mother or the nurse in charge.

This history is oftentimes of the greatest importance. It sheds light or may help to decide the question of latent tendencies, or hereditary taint. It should serve to answer the question as to how the child has behaved in previous illnesses; of their nature and duration. Mothers, as a rule, are careful observers, and their testimony should never be ignored. In trifling ailments it is usually not necessary to unclothe the child, nor subject it to prolonged and wearisome examination. But except in acute illnesses where the symptoms manifestly do not call for it, this is necessary. In all chronic complaints the child should be stripped to the skin, so that a thorough inspection can be made of the entire body. If the child is asleep at the time of the visit, so much the better. Certain points can be covered in the examination better than afterwards. For instance, the attitude; the posture, if easy and natural, or otherwise; the color of the face, if flushed or pale; the color of the lips, if white or livid; the state of the skin, whether moist or dry; the expression, if natural or painful. We should note the presence or absence of moaning, starting, twitching, grinding of the teeth; the action of the nostrils, if quiet or working strongly; the eyes, if closed, or only partly closed, or staring; the respiration, whether abdominal or thoracic. The respirations may now be counted, as well as the pulse. The condition of the fontanels should be noted; if closed or open, if pulsating, expanded or depressed. What is the relative size and shape of the head? Are the veins full and prominent? How long has the child been sleeping? A healthy child, under three months of age, should sleep twenty hours out of the twenty-four. During the next six months it should average from fifteen to eighteen hours. All of these matters can be looked after before the sleeping child is aroused, when the examination must proceed in a very different manner, and when, in many cases, all the tact and skill and patience and persistence of a major-general of infantry will necessarily be called into play. It is now that didactic teaching is worthless. When ill, the best-natured of babies is restless, fretful, irritable, and willful. It will not bear coercion. It resents a strange presence. It cannot understand the reason of being thumped and poked and handled in strange ways. Observations must be made between cries; and a glance must suffice for prolonged inspection. In many, indeed, perhaps in most cases, a little adroit cajolery will place the doctor upon such a footing of familiarity, that

all needed information can be in time secured. But only by patient and practiced effort. The special significance of the points above referred to, and which are to be elicited in the examination, will be fully brought out as the book progresses. To speak of them now would only amount to iteration. Their meaning will be be best understood as symptoms of the maladies to which they are the usual accompaniments.

Dr. Louis Starr, in his admirable work on the "Diseases of the Digestive Organs in Children," has given such succinct directions for examining the chest, that we quote the following paragraphs:

Auscultation.—"With infants, the back of the chest is most conveniently auscultated when the child is held in the nurse's left arm, with his breast against hers, his chin resting upon her left shoulder, his left arm around her neck, and his head kept in position by her disengaged hand. The front, when reclining on the back on a pillow. The sides, when sitting upright on the lap, first one arm and then the other arm being lifted up to allow the observer's ear to be applied. Older children may be made to take the same positions as adults.

"It is not sufficient to auscult the posterior aspect of the thorax alone, as is stated by some authors. The whole chest should be examined, particularly in doubtful cases. The signs of croupous pneumonia are most frequently discoverable at one or other base posteriorly; the friction sound of pleuritis at the junction of the middle and lower third, laterally; and the signs of emphysema at the apices anteriorly. Therefore, unless the exploration be thorough, important lesions may be overlooked.

"In healthy infants the inspiratory act in ordinary breathing is superficial, and the respiratory murmur, as a consequence, feeble. If, however, a deep inspiration be taken, a frequent occurrence under excitement and during crying, the murmur becomes loud, or assumes the character that Laennec termed *puerile* breathing. After the age of two years this form of respiration is habitual.

"Puerile breathing is characterized by its *intensity*, a property depending upon the thinness and elasticity of the chest-walls in childhood. There is no alteration in *rhythm*, the inspiratory element of the murmur being directly followed by the expiratory, and this in turn by an interval of silence; neither is there any change in the *pitch* or *duration* of the expiratory sound, which remains lower and shorter than that of inspiration. In other words, puerile respiration is simply a very intense vesicular respiration. The normal respiratory murmur is then feebler in infants, and louder in children over two years old, than in adults.

"The breathing is louder over the anterior, lateral and posterior inferior regions of the thorax. Faintest over the scapular and the precordial area. This absence occurs most frequently in young children, and is most noticeable over the lower posterior portions of the lungs. In the interscapular region, the ear, being directly over the larger bronchi, readily detects a deviation from the vesicular quality. Here the inspiratory murmur is loud, harsh and somewhat tubular in character. There is a slight pause between it and the expiratory murmur, and the latter is longer in duration and higher in pitch. There is, in fact, an approach to the bronchial type of breathing, which may always be heard in its purity by listening over the trachea.

"Sometimes a difference in the breathing can be detected over the apices anteriorly. On the left side the vesicular quality is purer, on the right the intensity is greater. The difference is most decided in the expiratory element, which, also, may be slightly prolonged on the right when compared with the left side. These modifications are due principally to the larger size and more horizontal course of the right primary bronchus. They are perfectly compatible with a normal state of the lungs. Should, however, the condition at the apices be reversed, and the intensity and prolongation of the expiratory sound be greater on the left side, the commencement of phthisis is indicated.

"If the child speaks, cries or coughs while the ear is applied to the chest a muffled, rumbling sound, the normal vocal resonance, will be heard. At the same time, vibration of the walls, the vocal fremitus, can be felt.

"The cardiac sounds are readily heard when the ear is placed on the precordia. In young infants the examination is somewhat difficult, on account of the rapid and excitable action of the heart, but after the first year, the circulation becoming slower and more regular, there is little trouble in distinguishing the sounds, and even slight alterations produced in them by disease. The first sound is longer and graver than the second, and the rhythm is ordinarily quite regular. In health the sounds may be heard under both clavicles for a short distance to the right of the sternum, and sometimes over the whole anterior surface of the chest. After muscular effort or during agitation, the heart sounds may be audible over the posterior aspect of the chest, but they are more distinct in this position when the lower lobe of either lung is consolidated by pneumonic exudation. The latter point is often of great value in distinguishing doubtful cases of pneumonia from pleural effusion.

Palpation.—"In practicing palpation the palmer surface of the well-warmed hand must be applied to the naked chest.

This method of exploration is useful as a means of determining the number of respiratory movements, the degree of expansion of the thoracic walls, the position of the cardiac apex beat, the presence or absence of painful regions and of pleural or bronchial fremitus, the existence of fluctuation in the intercostal spaces and the character of the vocal fremitus. For the last purpose, though, it is hardly worth while to make a separate step in the examination, for the vocal vibrations can be readily distinguished by the ear when applied to the chest in auscultation.

Percussion.—"In percussing the different surfaces of the chest, the child must be placed in the same position as for auscultation. When contrasting the two sides, percussion should be made in the identical regions, and during the same period of the respiratory movement. Babies, when constrained or when disturbed, hold their breaths in the intervals of crying, and as they always do so at the end of an inspiration, this is a favorable time to seize for the comparative examination. The percussion strokes must be lighter than in the adult, but in other respects the operation in no wise differs.

"In health the resonance will be found to correspond closely with the respiratory murmur. Thus, in infants under one year, the respiratory murmur being feeble, percussion is rather insonorous. Even at this age the case is different, when a deep breath is taken, and so soon as puerile respiration becomes established the resonance is uniformly intense. With the exception of this greater intensity, the sound is exactly similar to that obtainable in adults. It is always attended, too, by a sensation of elasticity, appreciated by the finger used as the pleximeter.

"Different portions of the thorax possess, normally, different degrees of sonorousness.

"In front, the right side is markedly resonant from the clavicle down to the fifth interspace, or the upper border of the sixth rib in the mammary line, where the liver dullness begins. On the left side the resonance is equally intense, but it is encroached upon by the gastric tympany, which extends upward as high as the seventh or sixth rib, as well as by the area of cardiac dullness. The latter forms an irregular triangle, of which one side is represented by a vertical line passing down the middle of the sternum, from the level of the fourth to the sixth rib; the other, by an oblique line touching the upper extremity of the first, and extending outward to the left, and downward, to terminate at the point of the apex beat; and the base, by a line drawn from the central point of the lower edge of the sternum (the inferior extremity of the first line), along the

sixth costal cartilage to the apex of the heart. Diminished resonance and elasticity are at once noticeable when the percussion passes from the lung to this area, though the precordial dullness is never so decidedly marked in children as it is in adults.

"Laterally, both supra-axillary regions are very resonant. The upper portions of the infra-axillary regions are a degree less resonant, and the lower portions are dull on account of the presence of the liver on the right and the spleen on the left side. The superior border of the liver dullness is found in the seventh interspace or at the eighth rib; that of the spleen, at the upper edge of the ninth rib. Gastric tympany may supplant the pulmonary resonance over the left infra-axillary region.

"Posteriorly, there is little resonance in the scapular region, particularly the supra-spinous portions. Over the inter-scapular space the sound improves, but it is less resonant than anteriorly or laterally. Over the infra-scapular regions the resonance is but little less pure than in front, until the tenth rib is reached on the right side and the liver dullness is again met with. On the left side the reasonance extends to the very base, the posterior splenic dullness being detected with difficulty. The right base is, therefore, naturally less resonant than the left, and this difference is especially marked during expiration, the liver rising higher at that time.

"Affections of the lungs produce various alterations in the percussion sound. The chief of these are the substitution of tympany, of dullness and of flatness for the normal resonance, and of increased resistance to the finger for elasticity. Cardiac diseases cause changes in both the extent and the shape of the area of precordial dullness."

CHAPTER II.

THERAPEUTIC HINTS.

THE opinion is very widespread that because no fatal cases of narcosis have been recorded from the use of homeopathic drugs that the remedies we employ in our practice are entirely harmless in any dose and frequency of repetition. Our fellow practitioners of the older school, have always asserted that our attenuated medicines could be taken by the pound or bucket-full without fear of harm, so long as the quantity did not overtax the distensive capacity of the patient's stomach. As this work is not written with a missionary purpose, but rather to instruct those who have already become convinced of the efficacy and superiority of our therapeutic methods and measures, no argument is here necessary to refute so erroneous an idea.

Nothing is useful that cannot be abused, and while homeopathic medicines in intelligent and skillful hands are only potent for good, there are some drugs in common use by practitioners of homeopathy that should be given to children with great caution, and with more circumspection than would be deemed necessary in administering them to adults. It may be remarked in this connection that a marked change has taken place in the practice of homeopathic physicians everywhere, within the last thirty years—a change which is noticeable, more especially in an increase of dosage and a growing skepticism regarding the intensification of drug action from dynamization—so called.

A considerable number of new remedies of priceless value, but which the founder of our system never heard or dreamed of, have been, and are being, added to our pharmacopeia. Many of these new remedies, if not all of them, have been quite generally adopted without subjecting them to the exhaustive "provings" that obtained in the Materia Medica Pura of Hahnneman. Such practice, it is freely admitted, is more or less empirical, but clinical experience indorses it, and only the narrow-minded reject it. The author believes that he voices the sentiment of the representative members of our school of practice, in saying, that at the present time we do not regard the therapeutic law of *similars* as all-pervading—applicable to all cases of sickness without exception or reference to causation; nor do we consider a drug more potent for good, the further it

is removed from the form in which it is found in nature. We believe, with Dr. J. P. Dake, that "the law of similars is not applicable to any diseases which are characterized by destruction of tissues, or where the cause cannot be removed, or to such as are due to chemical action, mechanical violence, or unhygienic surroundings."

Modern pathology has shed much light upon the nature and causes of many diseases, and shows that some are self-limited, and tend to recovery if left to the unaided power of nature; while others are incurable from the beginning and can only be palliated, whatever the system or method of treatment.

The intelligent physician cannot allow a dogma to close his eyes to these advances in medical science, nor can he afford, from mere devotion to such dogma, to allow a patient to suffer from pain which can be alleviated, but cannot be cured. The author is well aware of the fact that there are some able and intelligent practitioners of homeopathy who look askance at these modern tendencies and innovations, and are filled with apprehensions as to the result. The number of such persons, however, is small. No one need fear the light. True science cannot retrograde. Homeopathy is progressing upward and onward, not downward or backward. In the following pages remedies will sometimes be recommended which cannot be regarded as strictly in accordance with the application of the law of similars, but which are sanctioned by experience, which is sometimes paramount to law, as we in our half-blindness are able to see and construe it. But it is not the province of this work to engage in polemics, nor to discuss questions which have no practical import, such as the size of the dose, the degree of attenuation, nor the alternation, combination or repetition of remedies. The author prefers to leave these matters to the fancy or the experience or the teaching of the individual. It is within his province, however, to point out the fact that there are certain drugs which the combined experience of the profession everywhere, regardless of schools, has come to regard as dangerous when given to the young. Over forty years ago, Dr. John B. Beck, published a volume of "Essays on Infant Therapeutics," etc., in which he devotes several chapters to the danger of giving opium, emetics and mercury to young subjects. In speaking of the effects of opium on children, he cites numerous cases where a single drop of laudanum has proven fatal to a young infant. The writer himself knows of several instances of death resulting from what was regarded as a perfectly safe dose of paregoric, when given to very young children. The author's coachman lost a babe a week old from giving, on his own responsibility, a dose of a much advertised

patent laxative medicine. Although given according to the printed directions, it proved fatal in less than an hour. A chemical analysis proved that it contained opium, although in its advertisements this fact was ostentatiously disclaimed. If the number of deaths of infants and children from anodynes, soothing syrups and the like, were known, the statement of actual facts would be something appalling. We have seen it stated that infants have been ptyalized by mercury when treated by followers of the homeopathic school. If this be true, it could only be by the grossest carelessness or the most inexcusable ignorance. It may be well, however, to state that mercury, even in our usual doses, should be given with care and not be continued for too long a period. Tartar emetic is another remedy of the greatest value, but which should be given with great care to young children. The writer once saw a child affected with uncontrollable emesis from this drug given in the third decimal trituration. Since that time he has never given it except after it has been greatly diluted with water. A two-grain powder 3* trit. should be dissolved in half a glass of water and given in teaspoonful doses as often as required.

The propriety of giving alcoholic stimulants to children is a mooted one. In diphtheria of a malignant type we have seen good results from the exhibition of dilute alcohol used as a gargle, and of whisky taken internally; and even in cases of very young children affected with diphtheria, we have given it almost to the point of intoxication. In some of the rapidly wasting diseases, or when there is danger of sudden collapse, alcoholic stimulants are appropriate and useful. But the habit of giving whisky and brandy to children whenever they complain of stomach ache, and the indiscriminate use which is made of them in domestic practice cannot be too severely condemned. It is a serious question whether alcohol in medicine has not done much more harm than good.

Atropine is another drug, whose action should always be watched when administered to infants. Even when given in very minute doses it is liable to produce aggravations, and in susceptible subjects it will sometimes produce a quasi-erythema confusing to the neophyte. What has just been said of atrophine holds true of all the so-called *alkaloids*. They should invariably be given in dilution, that is to say, dissolved in water, rather than in powder form.

The use of so-called "tonics" is one that is greatly abused. The best tonics in the world are those which are most easily secured, and which are not sold at either the drug stores or the pharmacies, viz.: fresh air and good food. Quinine and iron in

crude doses are very hard of digestion by the average infantile stomach, and when they are indicated our second or third decimal trituration is quite strong enough for all practical purposes. There is one "tonic" which is an exception to what has just been said. Cod-liver oil should not be classed among medicines, for it is really a food. It is a tonic, because all digestible foods are tonics. When the alimentary canal is in a state to absorb it, cod-liver oil is oftentimes of immense usefulness. It should be remembered, however, that the power of digesting fats in early life is not great and for this reason it should be given tentatively and in small doses. Two or three drops is enough for an infant under six months of age.

In cases where the oil is not assimilated and yet seems to be indicated, its benefit may be secured by inunction. The skin absorbs it with great readiness.

Whatever may be said for or against the use of tonics and stimulants, there can be no two opinions about giving to children the new coal-oil products known as anti-febrine, anti-pyrine, phenacetine, sulphonal, *et id omne genus*. Their action on the adult heart is not without danger, and they are altogether too powerful and too uncertain in their action to give to children under any circumstances or in any dose.

It seems to have been forgotten of late years by very many physicians that the most efficient anti-pyretic in the world is water. By the proper application of plain, simple water in different temperatures truly wonderful effects can be produced. Dr. Eustace Smith, in his excellent work on "Disease in Children" (1884) gives some admirable directions for giving baths with a view to getting their best therapeutic effects, and we quote the following paragraphs:

"The question of *reducing temperature*, when this rises to a dangerous height, is an important one. Children often bear a high temperature well, and it is not always easy to say what degree of heat constitutes hyperpyrexia in a child. When the fever is due to a septic cause it is perhaps less well borne than when it is the consequence merely of a local inflammation.

"In any case, if the temperature rise above 106°, or if the patient seem to be distressed by a less degree of heat, it is advisable to sponge the surface of the body with tepid water. If the fever be not reduced by this means, the child should be placed in a bath of the temperature of 75°, and be kept there until the pyrexia undergoes a sensible diminution. Usually sponging the surface will reduce the bodily heat by several degrees, to the immediate relief of the patient. In cases of inflammatory diarrhœa, even in babies of a few months old, the

temperature often rises to 109° or 110°, and the child passes into a state of profound depression. When this happens, death is inevitable unless the pyrexia can be quickly reduced; and tepid bathing is often successful in greatly retarding, if it do not actually prevent, a fatal issue to the illness.

"In the treatment of disease in early life the remedies at our command are the same as are useful for similar conditions in the adult. On account, however, of the impressible nervous system in the young subject external applications are of greater importance in childhood than they become in after years. Amongst the remedies of the greatest value baths form a class of no little importance. According to the temperature of the water employed the bath becomes a sedative, a stimulant, or a tonic, as may be required; and in these different shapes is often resorted to with great advantage. The usefulness of tepid bathing in reducing fever has already been referred to.

"The *warm bath* (80° to 85° Fahr.) is very useful in cases of convulsions or great irritability of the nervous system, shown by agitation, restlessness, spasm or disturbed sleep. It calms the excitement, allays spasm, promotes the action of the skin and induces sleep. On account of its diaphoretic effect warm bathing is of great service in cases of Bright's disease. In infants the warm bath has a sensible influence in promoting the action of the bowels, and in cases of constipation is often a valuable addition to purgative medicines. The child should remain from ten to twenty minutes in the warm water.

"The *hot bath* (95° to 100° Fahr.) is of great value as a stimulant where there is sudden and severe prostration, such as occurs in cases of profuse diarrhœa, urgent vomiting, shock, or other cause which induces a temporary depression of the vital energies. When employed in this way as a stimulant the child must not remain too long in the water or the stimulative effect will pass off and be succeeded by depression. For an infant three, and for an older child five minutes, will be sufficient immersion. The patient can then be removed, wiped rapidly dry, and laid between blankets with a hot bottle to his feet. This bath may be made more stimulating by the addition of mustard. Flour of mustard, in the proportion of one ounce to each gallon of water, is mixed up with a little warm water into a thin paste and placed in a piece of muslin. This is squeezed in the hot water until the latter becomes strongly sinapised. So prepared, the mustard bath is an important remedy in cases of prostration and collapse. The child should be held in the bath until the arms of the attendant supporting him begin to tingle.

"The *cold douche* is a tonic of the utmost value. It must,

however, be employed with discretion, for the patient if weakly seldom obtains a proper reaction unless special precautions be taken. If the child looks blue or feels chilly after the bath, the shock to the system has been too violent. For a weakly child the cold douche should always be given in the following way: On rising from his bed the child is thoroughly shampooed all over the body, using steady friction, especially to the back and loins. His skin being thus stimulated and prepared to resist the shock of the cold water, the patient is made to sit in a few inches of water as hot as he can conveniently bear it, and then immediately a pitcher of cold water (55° to 60°) is emptied over his shoulders. He is then at once removed, and well rubbed with a rough towel to assist reaction. In winter the bath should be placed before the fire, and every care should be taken to make the process a rapid one. The shampooing will occupy from ten to fifteen minutes, but the douche should be over in as many seconds. It is well to allow the child a drink of milk or a biscuit before beginning the process; and when dried the child may return to his bed for a short time if thought desirable; but after one or two repetitions of the bath this precaution will be unnecessary. So employed, the bath must be regarded purely as a therapeutic agent, and not as a cleansing process. The body may be washed in the ordinary way at night before the child is put to bed.

"The cold douche is of great service in all cases of weakness, whether this be due to acute or chronic illness, and is only inadmissible if the lungs are actively diseased or there is fever. It is especially useful in cases of long-standing derangement and in the scrofulous cachexia, and may be recommended without hesitation for children of very fragile appearance. In addition to its tonic effect the bath has another valuable quality in that it strengthens the resisting power of the body against changes of temperature, and lessens the susceptibility to cold."

The wet sheet pack is a valuable means of exciting diaphoresis, as in post-scarlatinal dropsy, and for equalizing the circulation under any circumstances. It should be given in the following manner: The bed is first prepared by being spread with several layers of woolen blankets. Then while the child is being stripped an attendant should wring out a cotton sheet which has been immersed in a bucket of boiling hot water. The water must be very hot or the wet sheet will be cold before the patient can be wrapped up in it. The sheet should then be quickly spread on the open blankets and the child wrapped up in it, leaving only the head exposed. Now the blankets should be brought over and tucked in all around as snugly as

may be. A cloth wet in *cold water* should be placed on the head and left there as long as the pack is continued.

The duration of the pack is to be decided by circumstances. It may last from fifteen or twenty minutes to an hour or more. If the child drops asleep it may be left undisturbed until it awakens. When taken out the cool sponge should be used, or the douche, as described above."

CHAPTER III.

DISEASES AND ACCIDENTS IMMEDIATELY FOLLOWING BIRTH.

We have already referred to the changes which take place in the circulation at the moment of birth, and this momentous change from a dependent, parasitic life to an independent existence is usually inaugurated without trouble or accident. But it is not always so. Occasionally the lungs fail to expand and the mother's heart fails to be gladdened by the sound of the first cry of the new born.

Sometimes the child, the victim of disease or starvation in utero, is born in such a state of debility as to be too weak to cry. Sometimes it is apparently dead and sometimes really so —still-born. In cases of asthenia, the infant lacks the red color of health and is pale, at times blue; its features are shrivelled and its body emaciated. Under these circumstances it would be quite improper to subject the weakling to the same treatment that would be appropriate for the strong and healthy. At times this state of debility is so great that it is best to postpone the washing and dressing, which otherwise should be done as soon as practicable after birth. All that can be done is to envelop it in hot flannel, or better still in hot carded cotton or wool. If, however, the child is not too weak it may be greased and washed—a little whisky or alcohol being added to the water, which should be as hot as can be borne, say 110° to 120° Fahrenheit.

These feeble infants bear a very high degree of heat. All obstructions to respiration should previously have been removed by carefully wiping out the buccal cavity, and if there be any suspicion of obstruction in larynx or trachea, the expedient may be resorted to which is often successful, to hold the child by the lower extremities, with its head down, and then to shake it briskly, or spank it sharply on the nates; a sudden inspiration is thus evoked, followed by a cough which may remove the whole trouble.

If this fails, measures should be taken to increase as speedily as possible the strength of the child until it can take a full inspiration. To this end stimulating nourishment should be given, a little at a time, but frequently.

A little cream, diluted with hot water to which a little whisky may be added, is best. The child is too weak to nurse, and yet it must have food. A teaspoonful of whisky or brandy may be added to five or six teaspoonfuls of hot water, slightly sweetened, and this given every few minutes in half-teaspoonful doses for a time. In this way some of these lives may be saved. But unfortunately others will fail to respond to the stimuli and become colder and colder, and bluer and bluer; their respiration becomes more and more feeble, until it finally ceases altogether.

But besides these cases of feebleness at birth, it sometimes happens that a child plump, well nourished and perfectly formed is still-born, due to a state of asphyxia from compression of the umbilical cord or from breech presentation; from premature detachment of the placenta, or other accidents incidental to labor.

Sometimes an apoplectic condition of the child is found—a congestion of the brain and the blood vessels leading thereto producing a paralytic condition of the respiratory nerves, which under these conditions fail to respond to the stimulus of the air after being brought into the world and prompt measures must be employed or apparent death may speedily become an actuality. The signs of this condition are swollen features and face red or purplish blue. When this condition is observed and the child does not breathe, no time should be lost in letting a few drops of blood escape from the cut extremity of the cord. This expedient tends to relieve the congestion of the brain and to equalize the general circulation.

Brisk rubbing of the body should next be resorted to; slapping the nates; plunging the body alternately into hot and cold water; and if these means fail recourse must then be had to artificial respiration. This is best accomplished as follows: The child should be placed on its side in such a position that the epiglottis falls forward; a towel or napkin should be wrapped around the child's mouth, leaving an opening through which the operator can blow his breath. In the meanwhile compression should be made on the epigastrium. A little air, notwithstanding the compression, will enter the stomach, and some will escape by the nostrils, but the rest will enter the lungs. Immediately the hand, passing from the epigastrium to the thorax, compresses it gently, though with sufficient force to produce expiration. This should be repeated six or eight times per minute. Very soon in many cases the heart's action, previously slow or almost imperceptible, will be quickened and resuscitation will sometimes be successful, even when the heart had ceased to beat for a considerable time. The physician should

not abandon hope in these cases until artificial respiration has been continued for at least half an hour. Dr. Penrose cites a case when success rewarded effort *after an hour and a half.** It matters not how small the proportion of these cases respond to our efforts, the duty is imperative and the number of resuscitations is sufficiently large to encourage our hopes and stimulate our zeal.

CAPUT SUCCEDANEUM; CEPHALHEMATOMA.—Extravasation of blood into that part of the scalp which presents during birth occasionally occurs, owing either to the duration of the labor or the intensity of the uterine contractions. The term "caput succedaneum," is the term employed to designate the swelling on the head when thus caused. Its seat is in the loose connective tissue of the scalp, and is external to the pericranium. The tumor is soft, painless and usually located upon the occiput. It consists mostly of serum or serum mixed with extravasated blood. This exudation, being in the loose connective tissue as just stated, produces no discomfort to the child and except its unsightliness is a matter of little moment. It is quickly absorbed and usually does not last more than two or three days. It does not require any treatment.

A somewhat different condition exists in what is called cephalhematoma. Here the blood and serum are extravasated *under* the pericranium as well as *above* it, and we not only have the caput succedaneum just described, but underneath it a tumor which is observed when the other declines. It is usually found upon the occipital or parietal bones, near the posterior fontanels. Being situated under the pericranium, it separates this from the bone, but owing to the resistance it meets with in the firmly attached membrane, it does not spread far and rarely crosses a suture. This tumor is not so readily absorbed as the former, and is therefore more permanent, not disappearing oftentimes for several weeks. Indeed, after the lapse of several months a slight prominence may be detected, indicating the seat of the tumor. This is occasioned by the fact that the pericranium does not lose its vitality from being separated from the bone, but continues to perform its functions and a ring of new bone formation is the result. This can be readily detected by the finger, as it surrounds the base of the tumor. This new bone is thin and flexible at first, but becomes firmer as absorption goes on. It ultimately disappears, leaving only a faintly defined thickening over its seat.

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*See Cyclopedia of Diseases of Children, vol. 1, page 249.

UMBILICAL HEMORRHAGE.—Besides the profuse and even fatal hemorrhages which occur at birth or soon after from careless ligature of the umbilical cord, there is another form of umbilical hemorrhage in which the accoucheur is in no wise responsible. Over three hundred cases of the kind have been reported from time to time in the various medical journals and reports, and their causes have been studied by such accurate observers as Dr. Francis Moriat, Prof. Stephen Smith and Dr. J. Foster Jenkins. Their investigations brought out the following results:

"*Causes.*—The common proximate cause is feeble coagulability of the blood. In the normal state, when the cord is ligated, the fibrin of the blood, which now ceases to flow in the umbilical vessels, forms coagula so firm that, by the time the cord is detached, hemorrhage is impossible. But in the majority of those affected with this disease, the clots are so soft and loose that they do not present any effectual barrier in the pressure of blood, which therefore oozes through them or presses them away. This lack of coagulability is easily demonstrated, for if a little blood, as it escapes, is caught in a vessel, it will be found to remain liquid a long time. This dyscrasia, or morbid state of the blood, which we therefore recognize as a chief cause of the hemorrhage, does not have the same origin in all cases. It is sometimes due to inherited syphilis. The infant affected with it may be plump, and appear well at birth, but in most instances, when the hemorrhage is to occur, it is puny and cachectic, exhibiting also local manifestations of the disease with which it is affected. Thus, in a case in my practice, the infant, puny and apparently born before term, was observed to have several blebs of pemphigus on the first day, from some of which blood began to ooze, but the fatal umbilical hemorrhages did not commence till after two weeks.

"In about one-fifth of the cases ecchymoses or petechiæ have been observed upon various parts of the surface, affording additional proof of the general blood disease.

"Jaundice is another cause of impoverishment of the blood in the new-born, and therefore of umbilical hemorrhage. The writers who have collected records of the hemorrhage, all remark the frequent occurrence of the icteric hue, both before and during the bleeding. It is not improbable that, in certain instances, the jaundice is hematogenous, arising from destruction of the red corpuscles and liberation of the hematin, a not unusual result of a profound dyscrasia, whether syphilitic or originating in some other cause. But in other, and probably most instances, the jaundice proceeds from the liver, and is the cause of the change in the blood. Thus, in five of Jen-

kin's cases, there was occlusion of the hepatic or common bile-ducts, and jaundice, from the presence of biliary acids in the blood, causes diminution in the amount of fibrin and red corpuscles. In the ordinary form of icterus neonatorum, the cause of which is found in the relative fullness of the capillaries and minute bile-ducts in the acini of the liver, the coagulability of the blood must evidently be impaired in proportion to the degree and duration of the jaundice.

"Poor health of the mother, and impoverishment of her blood during gestation, whether from chronic disease, as tuberculosis, or anti-hygienic conditions, also cause impoverishment and diminished coagulability of the blood of the child, and are therefore causes of the hemorrhage. The excessive use of diluent drinks or alkalies by the mother is believed by some to have a similar effect.

"In certain cases the hemorrhage is due to an inherited hemorrhagic diathesis. In nine of Jenkins' cases the mothers were subject to menorrhagia, and liable to bleed freely after parturition, and from injuries; and seventeen other mothers had each lost more than one infant from umbilical hemorrhage. Probably in those cases in which the hemorrhage commences before detachment of the cord, and external to its point of insertion, the hemorrhagic diathesis is the main cause of the flow.

"Although the cause of umbilical hemorrhage in the majority of cases is the vitiated state of the blood itself, observers, among others the late Sir James Y. Simpson, have met with cases in which the hemorrhage was referable to the state of the vessels. In order that the vessels be effectually closed by the fibrinous coagula, their walls should have their normal contractility, but this is in great part lost, by inflammation (arteritis or phlebitis) which sometimes occurs in these vessels, as we have already seen. Inflammation, whether of artery or vein, causes thickening and infiltration of its parietes, loss of tone on the part of the fibres of which they are composed, and therefore, a patulous state of the vessel; moreover, the inflammation is apt to be suppurative and the presence of pus in the vessel obviously hinders the formation of a firm and effective coagulum."

Symptoms.—Ordinarily, umbilical hemorrhage occurs without any premonition, but sometimes it is preceded by jaundice. Jenkins ascertained that jaundice was a prodormic symptom in 41 out of 178 cases, and besides the icteric hue, constipation, clay-colored stools, deeply-tinged urine, etc., were sometimes recorded. Rarely colicky pains and vomiting preceded the hemorrhage. The blood may be arterial or venous, or both.

It oozes slowly or rapidly, rarely escaping in a jet, even where there is reason to believe that it is arterial.

Prognosis.—This is unfavorable. Statistics show that five in every six perish. The prognosis is most unfavorable when jaundice or purpura is present. Those are most likely to recover who have a healthy parentage, no obvious dyscrasia, and in whom the hemorrhage occurs late and is not profuse. The average duration of the hemorrhage in 82 fatal cases in Jenkins' collection was three and one-half days, the minimum being three hours. After the arrest of the hemorrhage death may occur from exhaustion or the dyscrasia.

Treatment.—But little can be done for these cases medicinally. The bowels, which are usually constipated, should be kept open by enemata, and the jaundice treated by the remedies suitable to that condition. The modes of treating the bleeding parts have been various. Those most deserving of mention are the following: Injecting a styptic into the open vessels, applying a styptic by compress or sponge to the navel, covering the navel with dry or wet plaster of paris, constant pressure with the finger, which is tedious, but which maternal solicitude willingly provides, and lastly, the use of needles with ligature. All of these methods have been more or less successful in arresting the hemorrhage, but the last is most effectual, though painful. Two needles should be passed through the umbilicus at right angles, and a waxed thread wound around each in the form of a figure eight. In four or five days the needles should be removed and a poultice or simple dressing applied.

CHAPTER IV.

FOOD AND FEEDING.

EVERY new-born child, when it comes into the world, brings with it an iteration of the old problem, "wherewithal shall it be fed?" and we cannot avoid the question long, for if the babe be healthy, it will soon cry aloud for sustenance. The fires of life must be kept burning; its ever wasting secretions must be made good; material for repair and for growth must be constantly provided, or the organism will soon perish. When the mother is in good health and has an adequate supply of milk, or when in lieu of this, a young and healthy wet-nurse can be secured, the question of nourishment is easily settled, for there is no diversity of opinion as to the advantage of breast milk, and its superiority over every other kind of food, always provided, however, that the milk furnished by the breast of the mother or the wet-nurse proves on trial to agree with the child. Be it known that it is not every woman whose milk agrees with a new-born babe. We have a case in mind that very clearly demonstrates this fact. Some years ago we attended a woman some thirty-five years of age in her third confinement. The babe was born at full term, and was a strong, plump, ruddy infant. The mother was a type of physical health and strength. She had ample breasts with well-formed nipples, but she informed me that she could not nurse her children. I learned from her that her first child was a puny weakling during all the time she nursed it, and did not thrive and grow until after it was weaned when a year old; her second child, although large and plump at birth, was nursed by her until it died at eight months of age. It declined steadily from the time it was born until death. Notwithstanding this discouraging history, I urged her to try it again, and she readily agreed to make the experiment. In due time she had an abundant flow of milk, and I had it carefully analyzed. Not a fault could be found with it. It was up to the standard in every respect. The babe took the breast eagerly, and for a week all went well. It neither gained nor lost in weight; but in the second week it became fretful and peevish, cried almost continually, and lost a pound in weight. Again I had the milk analyzed, with the same result as before. It answered to every test, and was pronounced

perfect in every respect. But the baby steadily lost ground, and at the end of three weeks was put on artificial food. It was not until after six months that it began to grow and thrive as it should. It is now, however, at the age of eight or nine years, a strong, full-sized and healthy girl. I learned a lesson from this case that has been of much service to me since then, viz., that the baby is itself the best and the only sure test of food, whether it be natural or artificial. Indeed, the fundamental principle of feeding is to adapt the food to the wants and the capacity of the individual infant. It will not do to have any rigid and inflexible rules. Precedent is apt to mislead; tables of nutritive equivalents are worthless; chemical analysis is valueless.

There is a vital chemistry which is too subtle for the laboratory; changes and physical alterations occur in food which are too delicate for tests or analysis; and yet they make all the difference between digestion and indigestion—between assimilation and non-assimilation—between life and death. Trial is the only touchstone, experiment the only guide that will lead us in safe paths. That organic chemistry is incompetent to pass on the question of foods at all times—that it is liable to mislead at any time unless its physiological peculiarities are also considered, is evident from certain well-known facts. For example, milk that has undergone change, that is "turned," is regarded, and very justly so, as unfit to be taken into a baby's stomach as food; and yet, no sooner is fresh, sweet milk taken into the stomach than lactic acid is formed and the milk is "curdled."

The milk is not assimilable until this change takes place; but it must take place *within* the stomach and not *out* of it. Again, chemistry teaches us that all foods are divisible into the nitrogenous and non-nitrogenous, and that the former are the plastic or tissue-forming elements, while the latter are respiratory or heat-producing merely. The natural inference is that the one class of elements is far more essential to the organism than the other. And yet the fact is that not a cell nor a fiber can be formed, nor can they subsist, without a certain amount of fats and salts. Not a tissue can come into being, nor continue its functions, without a large proportion of *non*-nitrogenous materials — a proportion greatly exceeding the nitrogenous. If the proteids are a *sine qua non*, so also are fats, water and salts. When chemistry teaches, as it does, that "only nitrogenous substances are capable of conversion into blood," it teaches a palpable fallacy and leads us at once into a maze of error.

We have said this much to illustrate the statement that, because the milk of the mother or the wet-nurse is able to pass muster when subjected to chemical analysis, it does not therefore follow that it must and does fulfill all the requirements for the nourishment of the new-born child. The child's stomach offers a better and higher test.

Such instances as that narrated, when not only one but several children have failed to be nourished by the milk of a robust mother, are exceptional, but they do occur and it is proper the student and the young practitioner should be made acquainted with the fact. Other cases there are, and these are far more common, where mothers are fully able and willing to nurse their offspring, but who should never be permitted to do so, if the future well-being of the child is properly considered. The danger of aggravating or transmitting constitutional taints through nursing is universally admitted. That only healthy mothers should nurse their young is so palpably true that the bare statement of the fact is sufficient. But as Dr. Jacobi well says:*

"Health is a relative term, and the general health of the body is quite compatible with defective development of one or more of its parts. Thus, even well-formed breasts may contain diminutive milk glands, whose imperfection is concealed by the abundant adipose tissue lying under the skin. Again, the glands may be sufficiently large, yet their activity be continually interfered with by the irritable condition of the nervous system. . . . The evil influence of an excitable, nervous temperament may be manifested in the quality of the milk, which, under violent emotions, may be so altered as to become a positive poison to the child.

"Generally the effects of such alteration are confined to digestive disturbances, to vomiting, colic, purging. But in some rare instances, whose record is famous, a child put to the breast of a woman still agitated by violent excitement, has been seized with convulsions, or has died suddenly, without the warning of any symptoms whatever. In these cases a virulent ferment seems to have been generated in the milk, analogous in the intensity of its action to that formed in the saliva of a hydrophobic dog, and whose malignancy varies according to its abundance and to the mass of milk that had been decomposed under its influence.

"For these reasons, a woman with a markedly nervous temperament is generally unsuitable for the office of nursing, since her milk is liable to become deficient in quantity or perverted in quality."

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*"Infant Diet," 1880.

Where the child is born with a harelip or a cleft palate, there is an impediment to nursing on the part of the child that is insuperable. To understand this it is necessary to comprehend the mechanism of suction.

Again we quote from Dr. Jacobi: "When the child seizes the nipple, the lips, fitting accurately around it, close the cavity of the mouth in front, while behind, this cavity is closed by the soft palate, which falls like a curtain upon the root of the tongue. The tongue arches so as to touch the roof of the mouth, and the cavity is thus completely filled up, as the cylinder of a pump is filled by the piston. When the child begins to suck, the tongue is drawn back, just as the piston would be, and for the same purpose, to create a vacuum in the space left between its tip and the lips. Into this vacuum the milk is forced by the pressure of the atmosphere on the breast.

"As soon as the space is filled, the milk is thrown to the back of the mouth by the tongue, which abandons for this purpose its office as piston, the soft palate is lifted up to a level with the roof of the mouth, thus closing the communication with the nose, and the milk falls into the throat, there exciting automatic contractions of the pharynx, that occasion a distinct sound of deglutition. This movement of deglutition alternates therefore with that of suction."

When the tongue is "tied," *i. e.*, bound down to the floor of the mouth, it is easily seen that the act of suction cannot be accomplished until the defect is remedied. It cannot retreat sufficiently to act as a piston. This impediment is easily removed by snipping the *frenum linguæ* sufficiently to release the tongue. This should be done with a pair of blunt-pointed scissors, care being taken not to cut too far back for fear of injuring a branch of the lingual artery. Where the mother's nipples are absent, from accident or disease, or are illy formed, it is often a fruitless task to remedy the defect sufficiently to enable her to nurse successfully. No shield or artificial nipple is made that can be fully relied upon. It is better to abandon the effort in the beginning. This statement does not apply to nipples that are merely depressed, as we shall see presently.

WOMEN WHO SHOULD NOT NURSE.—But a constitutional disease in the mother and some acute morbid conditions are a barrier to nursing that cannot be ignored. The blood of rheumatic women contains an excess of lactic acid, and their milk will inevitably create a ferment in the child's stomach disastrous to its health. The children of such women are proverbially illy nourished, undersized, thin and nervous.

When the mother is anemic—that is to say, when her blood is impoverished from deprivation or overwork—the solid constituents of the milk are necessarily diminished. The milk is thin and watery and more or less wanting in the essentials of full nutrition. Consumption, syphilis, epilepsy, scrofula, cancer, are all so readily transmissible as to be prohibitory if one expects the child to grow to healthy maturity. Chronic eruptions should probably be put into the same category, for the obvious reason that out of pure blood can we alone expect pure milk. Mania, if it amounts to insanity, renders the act of nursing too precarious or even dangerous to be permitted. The essential fevers, if of a mild type, which do not affect the mother's reason, nor interfere with the flow of milk, need not interfere with the performance of the functions, especially if they be not so prolonged as to greatly exhaust the strength and imperil life. Erysipelas is a disease that appears to affect the milk badly and render it unfit for nursing. There are cases recorded of this disease occurring during lactation in which the results to the infant were fatal.

Suppurative inflammation of the breast offers sufficient reason for suspending its use, at least until the milk secreted by it is free from pus. In cases where the nipple is cracked or fissured and a secretion of pus takes place, this also is a sufficient reason why nursing should be interdicted until the trouble is cured. This can usually be effected by the frequent application of the compound tr. of benzoin, or tr. of calendula. Washing the nipple frequently with a solution of borax will often prove serviceable. Primipara should be instructed to apply some astringent to their nipples daily during the last month or so of their pregnancy, in order to harden them and prepare them for the application of the child's mouth which, under neglect, is sometimes at first very painful. At the same time this is done traction should be made on the nipple with the fingers in cases where this organ, which is so essential to the proper performance of the function, is depressed or retracted. Even in bad cases of depression, a fair nipple can be developed by persistent and intelligent effort.

The Goodyear breast-pump, if properly and persistently used for a month or more before confinement, will, by the suction which is brought to bear upon the depressed nipple often develop an otherwise useless organ into one which may answer every purpose. A common clay pipe with its edges made smooth is another expedient which is frequently resorted to with success.

Where this matter has not been attended to prior to the birth of the child, the primipara should be encouraged to hope

that as the infant grows stronger its natural effort will succeed after a time in overcoming the defect and develop a nipple that will answer all necessary purposes.

Women who have never suckled, become very impatient and nervous when they discover their inability to perform the act at once, and become feverish and excited, which has a deleterious effect upon the milk. Such women should be assured that in all probability, the difficulty will pass away in a few days or a week, and that their unremitting efforts to nurse at the expense of rest and sleep are detrimental both to mother and babe.

While waiting for the young infant to gather sufficient strength to draw out a serviceable nipple the desired object can often be expedited by calling in the service of an older and stronger nursling, who by its more vigorous efforts and greater experience may be able to seize the nipple and develop it. It is every way essential to successful nursing that the mind of the young mother should be calm and placid. Anything which creates apprehension or interferes with repose militates strongly against the function of lactation and renders both mother and child ill.

MENSTRUATION AND PREGNANCY.—There is a diversity of opinion among authors as to the effect of menstruation upon the mother's milk and thence upon the child. On the one hand, it is claimed, that if any disturbance is felt by the nursing infant, at the first return of the menstrual flow, it is ordinarily attended with but little, if any serious effects, which are not only trifling in character, but brief in duration ; that the great advantages to the child from having the breast, especially to fall back on in case of sudden illness, far outweighs the disadvantages and dangers. It is also claimed that the milk is so little changed in quality even during the flow that its effect on the child's nutrition and growth is inappreciable. On the other hand, it is stated on good authority that in many cases the indigestion which is set up at this time is or may be serious ; that vomiting and diarrhea are not at all exceptional, and even more dangerous symptoms are not uncommon. My own observation leads me to think that few women can carry on the two functions successfully at the same time. I am sure that this is so when the menstrual flow is excessive or unduly prolonged ; or again when it is attended with much pain and general constitutional disturbance. Under these circumstances the nursing babe is almost sure to suffer more or less from some gastric disturbance, which is apt to continue until the flow is over, or at least for a day or two. It matters not that chemical analysis

shows that, ordinarily, the milk is but little altered in its physical composition. The fact that the baby shows it in colic and diarrhea, feverishness and fretting, is evidence enough that temporarily at least the milk is a cause of disturbance, and I have seen numerous cases where this condition was noticeable at each return of the menstrual epoch.

Our plan of late has been to advise weaning at the second return of the menses, unless there was something in the season of the year or other good reason for deferring it till a later period. It may be advisable in some cases, especially when the mother's milk has been agreeing with the child heretofore, to only partially wean it; giving it the breast in the intervals between the menstrual periods and feeding by bottle during the flow.

As to the effect of pregnancy on the function of lactation, there can be no two opinions. No woman can nurse a babe at the breast and do justice to another in her womb at the same time. One or the other—and commonly both—must inevitably suffer. As soon as pregnancy takes place in the nursing woman there is a diversion of some of the solid constituents of her milk to help in the formation of the fetus in utero. Her milk becomes thinner and more watery and the nursing babe begins to decline in weight and spirits.

A prolongation of the function under the circumstances is almost certain to result in a rickety child.

It will be a matter of good fortune if it does not result in two of them. Under certain circumstances, such as extremely hot weather, it may be deemed best to postpone weaning for a few weeks; but if a competent wet-nurse can be procured this is far preferable and far safer. No child should be weaned in the city during the extreme heat of summer, no matter what its age or the necessities which render the weaning expedient. All experience goes to show that summer complaint and cholera infantum are vastly more common during summer in the city than in the country, and a child just weaned is much more liable to these diseases than one accustomed to a miscellaneous diet.

Scantiness of Milk and Partial Feeding.—The exact amount of nourishment required by a healthy infant in each twenty-four hours can only be approximated. Some children take a great deal more than others and some women have a much more copious secretion than others. There is no fixed rule by which the quantity can be gauged or by which we can tell whether the secretion is ample for the needs of the infant except that test which we have spoken of before—the test of

experience. If the infant takes a proper amount of sleep—if it drops asleep habitually after nursing and has a long nap—if its color is normal and it seems happy and contented—if in addition it is perceptibly growing in weight, it is fair to presume that the milk is abundant in quantity and satisfactory in quality. If, on the other hand, the child is restless and fretful and soon exhausts the breast without being satisfied; if it wants to be nursing all the time and does not show evidences of growth and contentment, the inference is a just one that the milk is defective either in quality or quantity. Unless there are evidences to the contrary, it is fair to presume that it is the latter rather than the former. The signs of a good nurser will be mentioned in the next paragraph.

When the deficiency of milk is manifest, and we have reason to believe the quantity to be good as far as it goes, we should endeavor to increase the flow of milk by such means as may be at our command. There are two opposite conditions which militate against the due quantity of milk as well as its quality. They are the conditions of anemia and plethora. Either condition will disorder the secretion and yet both are amenable to treatment. The anemic woman should have a more generous diet, take plenty of exercise in the open air and by every means build up her general health. The other condition, that of hyperemia, is more commonly met with in wet-nurses who, by reason of their new vocation, have suddenly risen from want to affluence. A woman of the poorer classes, who is admitted into a well-fed household where plenty abounds, is very apt to gratify her appetite to the extent of gormandizing. If given all she wants, she will soon surfeit herself and become too plethoric for the proper performance of her duties.

Her breasts may increase in size, but mainly from a deposition of fat. The treatment of such cases is too obvious for comment. When a mother finds her milk deficient in the first few days of lactation, she should be encouraged to persist in her efforts to nurse, notwithstanding the small amount of secretion, for nothing so stimulates the flow of milk as suction.

The babe should be put often to the breast, and if it lacks sufficient strength to bring about an abundant flow, the breast pump may be employed as an auxiliary, and the milk thus extracted fed to the infant. The use of electricity is oftentimes very beneficial. The Faradic current is the one we have usually employed, and the one we regard as most efficacious. The fact is now well established by physiological experiments that glandular organs can be made to secrete more actively by the stimulus of electricity and its clinical employment as a galactagogue affords ample proof of its efficacy. We have very ma-

terially promoted the secretion in numerous cases and regard it as superior in general to all other means.

In employing electricity for this purpose we apply the positive pole—the sponges being well moistened with warm water—to the hypogastric region just over the solar plexus, and the negative over the mamme, moving the electrode about constantly during the application. After the current has been applied for from three to five minutes, the poles may be placed on and around the breasts, so as to direct it through them from side to side. The current should be as strong as can be borne without discomfort.

In spite of all our efforts we frequently fail to establish an adequate secretion of milk to meet the wants of the insatiate infant, and we are confronted with the question whether the mother, with only a partial supply of nutriment, should continue to nurse the child, giving it all she is able, and supplement this with artificial food, or abandon nursing altogether. There is a popular notion—a fallacy, as we regard it—that mixed food is not likely to agree with the average child. How this prejudice against combining suckling and hand-feeding has happened to become so widespread is a mystery. It surely is illogical and contrary to clinical experience. If human milk and cow's milk fail to agree when they commingle in the child's stomach and create a disturbance there, it surely is not the mother's milk that is to blame, provided her milk is healthy, and quantity is its only fault. The cow's milk may disagree, but rarely the mother's. All that the child can get of this, the better; it is pure gain. It may be that the child is unable to digest cow's milk, or any of the other artificial foods that are presented in the way of substitute for the deficiency, but this is all the more reason why it should have as much mother's milk as it can get; for this it *can* digest, and half a loaf is better than no bread.

The diet of a nursing woman should be generous without being rich. She should, if her supply of milk is at all deficient, drink freely of cow's milk and good, nutritious soups. Oatmeal and barley gruels are most excellent milk-makers, and plenty of fluids should enter into her dietary. This does not mean that her entire food should be of the "sloppy" order, for she may eat with reasonable freedom of all that experience has taught her to regard as wholesome. She should avoid spices and all forms of condiments, and such articles of food and drink as are over stimulating. She need not abstain from acid fruits, if she is fond of them, and finds on trial that they do not disturb the baby's stomach.

Theoretically, fruit acids ought not to disturb the digestion

of any nursing child, for in physiological digestion, long before the acid which is taken into the stomach of the mother can reach the milk glands through the blood, it is changed into alkalies, and is therefore harmless. Here is another instance, however, where practice turns its back on precept. Theory is one thing, and practical experience is quite another. In spite of the theory it is found that these acids do find their way into the milk, and gripe the baby whenever they are eaten. When this is so, they should be avoided, as well as all other articles of food that produce colic.

The use of beer and all fermented drinks by nursing women is to be deprecated. Their use as promoters of lactation is a delusion and a snare. Anemic women whose appetite is poor, may take ale or porter once or twice a day if it agrees, but neither of these should be relied upon to the exclusion of better things. These pallid mothers require a larger proportion of animal food than women in good general health ; while plethoric women with large appetites should restrict themselves to a diet more farinaceous. Various medicines have been employed to increase the lacteal secretion, but we know of none that has any claims worthy of mention. What remedies are taken should be directed to improve the general health, without regard to their direct effect on the milk supply.

Since writing the above, our attention has been called to a galactagogue which seems to possess considerable merit, and in the few cases in which we have used it, it has certainly increased the milk flow materially.

We refer to "Nutrolactis," prepared by the Nutrolactis Company, of New York. It is made from the fluid extracts of the plants Galega Officinalis and Galega Tephrosea—three parts of the former to one part of the latter. It is claimed that the use of this combination will greatly increase the quantity of milk in all of its essential elements, and maintain a sufficient flow during its employment.

THE SELECTION OF A WET-NURSE.—The introduction of a wet-nurse into a family sometimes becomes a necessary evil. We speak advisedly, for evil it proves to be so often in the course of a physician's experience, that he comes to regard it as more often than otherwise the opposite of a divine blessing. Still the necessity frequently arises, and the responsibility of selection is placed upon the physician in charge. I can scarcely conceive of a duty more onerous. The class of women who offer themselves for this kind of service is naturally open to suspicion in every way. Self-interest dictates the concealment of all impediments and disabilities. The physician should re-

gard it as his bounden duty to subject them to the most rigid investigation. If the infant of the woman offering herself as a wet-nurse can be seen, it will aid materially in deciding the question of her qualifications. In lieu of this, a certificate from the doctor who attended her in her confinement, is of much value. Even references from her employers, if she has previously been at service, may aid in the investigation. By personal inspection and otherwise the exact state of her health and the quantity of her milk should be ascertained. Other things being equal, the best wet-nurses are in general appearance, robust without being corpulent. They have a clear skin and a good complexion. Their breasts are full without being fat and tortuous veins are observed passing over them. Some wet-nurses give abundance of milk and that of the best quality whose breasts are small. These women appear to secrete their milk mainly during the time of suckling and it is a well-established fact that the richest milk is that which is newly secreted. The longer the milk remains in the breast the thinner it becomes. The loss of milk, habitually, by oozing is not a good recommendation for a nurse. It generally indicates a relaxed condition of the system, or a tendency to other fluxes of various kinds. It is a sign of weakness rather than of strength, and bears no relation as a rule to the abundance of milk retained. In selecting a wet-nurse attention should be given to the nipples to ascertain if they be well formed and prominent and free from excoriations and fissures. The presence or absence of colostrum should also be determined. There should be no colostrum after the eighth or ninth day in good milk. If there is colostrum present, as indicated by microscopical examination, it is probable that there is some fault in the health or the digestion of the wet-nurse, and that her milk may disagree with the infant. A simple test will determine approximately the richness of the nurse's milk. If a quantity of it be placed in a test tube and allowed to stand undisturbed for a time, the amount of cream which rises to the top should be about three per cent. and the casein and sugar are usually about the same in quantity as the cream. Milk which answers to this test may be regarded as up to the usual average.

The milk of a wet-nurse whose own child is not over six months of age will usually agree with a new-born infant. It is desirable that the wet-nurse herself should be under thirty years of age rather than over; and if she has previously suckled and had charge of infants it is an added advantage, for such a one has gained at least something in knowledge by her experience. Where several candidates for the position of wet-nurse present themselves, preference should be given, other things

being equal, to the one who is most tidy and cleanly. A woman who is slovenly about her clothing is generally careless about her person, and in either case her value in the household is depreciated.

DIRECTIONS FOR NURSING.—After the mother has had a few hours' rest and has sufficiently recovered from the fatigues of labor, and after the toilet of the new-born babe has been duly made, it should be applied to the breast. The small quantity of milk which it will find there is usually enough to satisfy its first craving, and the act of nursing promotes further secretion. The infant is so constituted that it does not require much food during the first few days after birth, for otherwise nature would provide for its needs sooner than she does. In point of fact, the full secretion is not established as a rule until the third day, so that, however often the child is placed at the breast, it obtains but little, and that little is colostrum rather than milk. The practice of giving sweetened water or other fluids, on the supposition that the child has been starving in utero and is born hungry, is a great mistake. The seeds of indigestion are liable to be sown in this manner which it may take weeks to overcome. Filling the stomach in this way has, moreover, a tendency to vitiate the infant's appetite and prevent it from drawing upon the nipples with the avidity which is necessary to stimulate a free flow of milk. Should the infant have nothing except what it is able to extract from the breast before the third day, no uneasiness need be felt on this account. Its stomach will be in much better condition to receive its legitimate food when it comes than if upset in the meantime by unsuitable foods. Should the child, however, refuse to be pacified, and especially if the third day comes without any increase of milk in the mother's breast, it will be quite proper to give at intervals of two or three hours a small feeding of cream and hot water—half and half—sweetened with sugar of milk. Cane and beet sugars should never be used for sweetening a baby's food if milk-sugar is obtainable. It is well to observe that the latter is not nearly so saccharine as the former, so that a larger quantity should be used.

As soon as the mother finds herself in condition to supply the alimentary needs of her child, its education should begin. It should be taught the primary lesson of good digestion, viz., regularity of feeding. During its first month it should nurse about every two hours during the day and twice during the night, or about ten times during each twenty-four hours. The stomach of the new born holds but little, while its digestion is very active.

After the first month the intervals of feeding may be gradually prolonged so that by the fourth month they should be three hours during the day, and by the sixth month four hours and once during the night. By this time the child should begin to take some artificial food—such as barley water and cow's milk—a good way being to alternate this with breast feeding. The practice which is all too common of putting the infant to the breast every time it cries, even though it has just been fed, is extremely pernicious. It is slavery for the mother and a detriment to the child.

A strong proof of the prevalent belief that every child is born into the world, not only with an immortal soul, but also a modicum of the seeds of "original sin," is found in the wonderful facility with which it falls into bad habits. The more these bad habits are fostered, the more they will grow; and in due time the mother will find, to her sorrow, a practical exemplification of the fact that "They who sow to the wind shall reap the whirlwind."

The infant stomach must have time to digest. It cannot work continuously and work well. If allowed to try the experiment anew, it will only result in indigestion, diarrhea and fretfulness. Systematic feeding at such intervals as will give the stomach time to dispose of the preceding meal will best subserve the interests of the child and the mother as well.

It is not intended by this that anything like mathematical exactness shall be observed. There are exceptions to all rules and circumstances alter cases. If the infant is having a quiet and natural sleep when the time comes around for nursing, common sense would dictate an undisturbed slumber and a postponement of nursing until it should awaken. It will be wide awake enough when its system requires more nutriment.

By the time an infant reaches the age of six or eight months, and sometimes earlier, the mother becomes more or less fagged, even though her menses have not yet appeared; her milk begins to deteriorate and lose something both in the matter of abundance and quality; at the same time the nutritive needs of the infant become greater; the teeth are beginning to come to the surface, and a greater amount of nourishment is now more needed than before. Few women are able to carry on the process of lactation beyond this period and meet the requirements of growth and development without the supplemental aid of artificial, or as Cheadle calls it, "alien" food. It is not necessary as yet, under ordinary circumstances, if the mother is strong and experiences no exhaustion from suckling, to wean the infant abruptly; but it is necessary to furnish some additional pabulum to meet the new requirements.

It is better to anticipate this need rather than to wait until its necessity is forced upon us. Besides this, it is better, as soon as the infant is of suitable age, to gradually accustom it to a less restricted diet than that of the breast. This age varies considerably. With some it may be reached by five or six months, while with others it may not be reached before nine or ten months. The mother's state of health, the infant's physical development, the time of year—various factors enter into the question, and in some cases hasten and in others defer this and all other experiments. The addition of supplementary food, as just advised, is deemed expedient, partly as a preparation for weaning entirely, which should rarely ever be postponed beyond the end of the first year. It is never best to wean an infant during the heat of summer, nor while ill, unless the illness be caused presumptively by the mother's milk.

As solid food requires a greater development of the digestive apparatus to accomplish perfect assimilation than liquid, the latter should be given in preference to the former, both with the breast milk and after weaning. Solid food, indeed, should not be given until the canine teeth have appeared. When they have come the infant should have sixteen teeth, and the peptic glands of the stomach be correspondingly developed. Even then it is better that weaning should be gradual rather than abrupt. The sudden change of food is apt to be followed by fretfulness and restlessness, while the gradual change, to an infant that for some time has been partially fed, is scarcely noticeable.

As to the food most desirable and safe to give to an infant after being taken from the breast, we refer the reader to the next chapter, on Artificial Food.

CHAPTER V.

FOOD AND FEEDING—(*Continued.*)

ARTIFICIAL FEEDING. — *Cow's Milk.* — When, for any reason, artificial feeding of an infant becomes necessary, the contingent problem becomes complicated and puzzling. Theoretically the matter is simple enough. The principles which underlie the substitution of foreign or "alien" food for that supplied by the human breast, are as simple as the alphabet. The analysis of a healthy woman's milk shows exactly the chemical constituents of that aliment which nature herself provides for the due sustenance of the human infant, and the relative proportion of the elements which enter into its normal composition. But, as we have seen already, nature does not make allowance for those aberrations of functional power on the part of the infant, and does not take into consideration the fact that infants are sometimes born with digestions so weak and imperfect that even breast-milk is beyond the powers of assimilation. There are occasional and exceptional cases in which the better the food the worse it is for the starveling infant.

To the uninitiated this may sound like a paradox, but just such paradoxes are met with not infrequently by the experienced physician One of the fundamental principles above alluded to is that a portion of the daily food of an infant must be animal. The young of all mammalia require food that has previously been digested and elaborated by another and an older animal. Vegetarianism may be well enough for those that like it; but whether good or bad for adults, it will not do for infants, and an exclusive diet of purely vegetable food is utterly inadequate to their growth and sustenance. One reason of this is that the infantile stomach is disproportionately small as compared with its nutritive needs. Vegetable food is far more bulky than animal, and hence a much greater quantity must be ingested to give the same equivalent in nutritive elements. More than this, all animal food is partly pre-digested, and but little more needs to be done after ingestion to render its fibrine and albumen or casein fit for absorption and nutrition.

This necessity for animal food, which, in a breast-fed infant, is supplied by the mother or the wet-nurse, is met by the substitution in other cases of the milk of one of the lower animals.

Singularly enough, not one of these provides a food for its young which is precisely like that of the human female. The milk of the ass, goat, mare and cow, all show differences, both chemically and in the way they behave when taken into the infant's stomach. Still these differences are not very great, and it would seem as if art ought to be able to remove excesses and supply deficiencies, and make the milk of either of these animals approximate very closely, if not entirely, to the average of human milk. The problem, simple as it seems, is not unattended with difficulties. It has been found that asses' milk is more like human milk than any other. But we have no establishments in this country, such as are found in London, where asses' milk is provided on a large scale for infantile needs, and other emergencies. Goats' milk, while closely resembling human milk, has a peculiar odor which renders it objectionable; and since all milk other than human must be modified more or less to adapt it to the human infant, it is as easy to deal with cow's milk as any other. Although cow's milk when freshly drawn differs in essential respects from human, its defects could be easily remedied if we could always rely upon the freshness of our supply. In the country, where this can be done, the problem is not so difficult of solution. But in cities and larger towns, where the milk is usually twenty-four, or at least twelve hours old before it reaches the nursery, it is a very different matter. The attempt to overcome this objectionable feature by seeking a supply of milk from a stall-fed animal is futile. No cow can long maintain her health and continue to give good milk of standard quality, that is deprived of her accustomed exercise and changed in all her regular habits of life. Human milk is alkaline in its reaction; so is that of a cow roaming at large in the field, when it is newly drawn. But the milk of a cow that is stall-fed is acid in its reaction, and soon falls below the standard in the matter of cream.

There is a prevalent notion among the laity, that whether in city or country, the milk of one cow is preferable to the mixed milk of several cows. This is an error. Every cow's milk will vary from time to time and every cow is subject to many ailments which temporarily reduce her milk below the standard in some essential particular. The mixed milk of the dairy practically overcomes this difficulty, and will maintain a better average than that of any one cow. But the great trouble with dairy milk, even when served by an honest dairyman, is the length of time which must necessarily elapse between the milking of the cow and the delivery of the milk. Another trouble is that in spite of care the milk will in most, if not all cases, be more or less contaminated with filth and débris, and more or

less polluted either by the hands of the milker, the udder of the cow, or by impurities gathered in the course of transportation. Fermentative changes are thus easily and quickly set up, and by the time the milk is ready for use these changes may be progressing actively. On this account the milk should be strained through a muslin cloth as soon as received, and then boiled for five minutes and bi-carbonate of soda in the proportion of one grain to the ounce of milk should be added, in addition to the boiling. The milk should then be placed in the refrigerator or other cool place to be used as wanted. Bi-carbonate of soda is to be preferred to lime water as generally recommended, because the soda is more assimilable and much more effectual as an antacid. It seems illogical to take exception to the water of a well, that shows a precipitate of lime, and refuse to use it on the general table, and then go to the drug store to buy lime-water to put in the baby's milk.

Furthermore, Sir W. Roberts has shown that ten grains of bi-carbonate of soda are equivalent in antacid power to six ounces of lime water, and that its effects on the milk is to produce a more flocculent curd, the very thing which is so desirable in rendering cow's milk like that of the mother.

Peptonized Milk.—The principal reason why cow's milk is so difficult of digestion by the infant stomach, is not, as commonly supposed, because it contains more solid constituents than human milk, especially casein, but because this casein or curd coagulates into large masses as soon as it enters the stomach and the gastric juice is not sufficiently powerful to dissolve them. It remains there an insoluble bolus. To overcome this trouble, it has been proposed to predigest the milk by converting the casein into soluble peptone outside of the stomach. This removes all curd difficulty and leaves the same amount of nutriment in the milk that was there before it was peptonized. But although peptonized milk is rendered more digestible than milk not so treated, there are serious objections to its continual use. The chief of these objections is, that it takes from the stomach the proper exercise of its digestive function, and the organ becomes enfeebled thereby. This is a serious objection and should prevent the use of peptonized milk for any great length of time. In emergencies, however, and for the purpose of carrying an infant through an acute attack of indigestion from other causes, it is a valuable expedient. Peptonized milk has a perceptibly bitter flavor which makes some infants refuse it, but this difficulty can usually be overcome by the addition of a larger quantity of sweetening with sugar of milk or by using condensed milk, which is already highly sweetened. By using peptonizing powders, of which there are numerous brands in

the market, the proportion of pepsin can be made accurate and the amount reduced from day to day as it should be, if continued long.

Humanized Milk.—Some infants appear to be utterly unable to digest diluted cow's milk, in strength sufficient to sustain life. Even when diluted to the proportion of one part milk to three parts water, they are griped, filled with flatus and are constantly crying with pain and discomfort. They are restless and suffer with diarrhea as well as with colic. They become lean and flabby and ultimately, if no change be made, die of inanition. A successful device in such cases is to put the child upon what is called "artificial human milk." This is prepared by first removing all the cream by skimming, after the milk has stood for a time. Then the remainder is divided into two equal portions. From one portion, all the casein is removed by rennet, *i. e.*, converted into whey. The other portion is then mixed with the whey, and the whole of the cream added. This preparation will, therefore, contain all the lactine, all the cream, but only half the quantity of casein. It will thus be nearer in composition to human milk than cow's milk, containing sufficient proteid and some excess of fat. But it is not absolutely identical with human milk, although the proportion of proteid is nearly the same, the curd is unchanged in nature. It is still, as ascertained by experiment, coarsely coagulable cow's milk curd, although less massive than that of undiluted cow's milk. The lactine is rather less, while the fat is in larger proportion than in human milk. This is probably an advantage, and some children who are able to digest only a limited amount of cow's milk casein do remarkably well on it. Dr. Cheadle, to whom I am indebted for this formula, states that humanized milk will not keep long. He says: "After a time, the cream separates with some curd in great clots and does not easily mix again. I have twice seen children dangerously ill from taking artificial human milk which had been sent a long distance and had changed in this way. If the dairy where it is manufactured is not within reasonable distance, have it made freshly at home." When thus freshly made there is no reason to apprehend any danger from its use.

Boiled Milk.—The use of boiled milk in diarrhea has long been a practice among the laity, because experience has taught that when thus treated, the milk is less laxative than when given in its raw state. The habitual use of boiled milk has been objected to by the profession, under the mistaken idea that it is rendered less digestible by boiling. Dr. Cheadle's experiments have demonstrated that when milk is boiled the curd coagulates in smaller masses than when fresh and un-

boiled. He says, "Dilute acetic acid, or vinegar, added to boiled cow's milk which has been allowed to grow cold, no longer produces the massive coagula, characteristic of fresh cow's milk, but smaller and lighter curd masses, although still much larger and coarser than those of human milk." There is another reason why all cow's milk used in the city nursery should be boiled, and that is that boiling arrests decomposition and thus puts a stop to the development of those irritant products that excite intestinal action. We shall see farther on that the dilution of milk with barley water or the juice of one of the other cereals promotes its digestion by mechanically separating the casein, so that it coagulates under the action of the gastric juice in minuter flocculi than that boiled even. A still further reason for boiling the milk for city fed infants is found in the fact now clearly demonstrated that milk is one of the commonest of disease carriers, and heating the milk to a temperature even of 180° Fahr., destroys contagium or renders it harmless. Boiling the milk entirely eradicates all danger from this source.

Boiling milk expels about three per cent. of its gases, and materially changes its odor and taste. As the boiled milk cools on contact with the air, a scum forms, which is the albumen coagulable by heat, entangling in its meshes a certain amount of fat. But as cow's milk contains relatively more albumen (casein) and fats than human, the slight loss entailed by boiling is immaterial.

Before proceeding further with the discussion let us see in what particulars human milk and cow's milk differ. (See table on opposite page.)

It will be seen that cow's milk, as compared with human milk, contains less water and sugar and more butter, casein and salts. In order to approximate the two kinds of milk as nearly as possible we add for an infant during its first month about two parts water to one part milk and also a little sugar. We thus bring the caseous element of cow's milk to about that of human milk and the sugar is about the same. In making this reduction, however, we have diminished other constituents below the standard of human milk, so that a larger quantity of it must be given than would be required of the latter if we would meet the requirements of the infant's system. By adding raw meat juice (see page 60) and cream, the proteids and fats can be increased as needed and that in a way not to be objectionable even to a stomach the most feeble.

Another, and perhaps a simpler way to reduce the amount of casein is to let the milk stand for an hour or so after it is delivered, and then, to pour off carefully, the upper half, for a

TABLE SHOWING THE PROPORTIONS PER CENT. OF THE DIFFERENT ELEMENTS IN VARIOUS KINDS AND PREPARATIONS OF MILK.—*Cheadle.*

Elements	Human milk (Luff)	Cow's Milk							Asses'	Goats'
		Fresh (Average from analyses by König, Wynter, Blyth, Attfield, and Whitelegge)					Condensed (Werner and Kohler)			
		Pure	Diluted with 2 parts water	Diluted with an equal quantity of water	Diluted with 1 part water to 2 milk	Artificial human milk*	Pure	Diluted with 7 parts water		
Nitrogenous elements or proteids (casein albumen)	2·35	4·374	1·458	2·187	2·916	2·57	26·1	3·26	1·7	4·5
Hydrocarbons or fats.	2·41	3·499	1·166	1·749	2·332	4·46	12·8	1·6	1·4	4·1
Carbohydrates — Lactine ...	6·39	4·403	1·467	2·201	2·934	5·02	16·0	2·0	6·4	5·8
Carbohydrates — Cane sugar	—	—	—	—	—	—	27·0	3·37	—	—
Lime	·019	·702	·234	·351	·468	·57	4·03	0·5	—	—
Phosphoric anhydride	·026									
Other constituents of ash	·295									
Water	88·51	87·122	95·675	93·522	91·350	87·38	14·07	89·27	90·5	85·6
Total	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

*Analysis supplied by Aylesbury Dairy Company.

very young infant, and the upper two-thirds, for an older one, and to do this without disturbing the lower strata of milk into which the principal part of the curd has gravitated.

By resorting to this procedure, the upper portion, which is the one to be given the infant, will be found to have about the consistence of human milk, with the proportionate amount of casein and fat, and does not require the addition of water and but very little sugar.

When fresh cow's milk is reduced in its casein, as just described, till the amount of its nitrogenous constituents is on a par with human milk, it is found, as we have said, to be below normal in its fat and sugar—the hydro-carbonates. This defect is remedied in a very ingenious manner by Dr. Kennedy, of New York, who prepares an artificial food which he calls Proteinol, and which can be added to the milk or other food, in quantities to suit any emergency.

Proteinol is made from the entire egg (shell and all), which is digested in fresh lemon juice; to this is added the clear fat from fresh killed beef, saccharated malt, and enough good brandy to keep it from undergoing change.

Dr. George W. Winterburn's favorite food for a healthy child of a month old, who is not as yet affected with vomiting or diarrhea, but who is obliged to be put on artificial food, is as follows: One teaspoonful of wheat flour, boiled, baked and grated as described on page 56; one teaspoonful of condensed milk (Eagle or Anglo-Swiss); one-half teaspoonful of proteinol, and twenty-four teaspoonfuls of water. "An analysis of this," he says, "and an analysis of healthy, normal, average human milk for a child of the same age, yield exactly the same results."

Sterilized Milk.—What has been said of the advantage of boiling milk and its increased digestibility thereby is only true if the milk be just brought to a boil and then removed from the fire—parboiled, as it were. If the boiling process be continued for any length of time, the effect on the casein which it contains is precisely like that on the albumen of egg. Prolonged boiling condenses it into a firm and indigestible coagulum like that of a hard-boiled egg. This, of course, is undesirable from every point of view. Even an adult stomach, unless exceptionally gifted, finds it difficult to dispose of either egg-albumen or milk casein that has been subjected to over-boiling.

All of the advantages which follow boiling the milk, can be secured by heating it to 68° C. or 155° Fahr. It has been found by experiment that this degree of heat destroys any injurious germs or active poisons, which may have found their way to it, either in the cow-yard or in course of transportation.

The taste of boiled milk is somewhat changed and rendered unpalatable, which is not the case if it be merely heated to the temperature above indicated. This process of heating, but not boiling, is called "sterilization," and answers all the purposes necessary for purification and preserving without any objectionable features. A simple means of accomplishing this object is thus described by the United States Secretary of Agriculture:

"The vessel containing the milk, which may be the bottle from which it is to be used or any other suitable vessel, is placed inside of a larger vessel of metal, which contains the water. If a bottle, it is plugged with absorbent cotton if this is at hand, or in its absence other clean cotton will answer. A small fruit jar, loosely covered, may be used instead of a bottle. The requirements are simply that the interior vessel shall be raised about half an inch above the bottom of the other and that the water shall reach nearly or quite as high as the milk. The apparatus is then heated on a range or stove until the water reaches a temperature of 155° Fahr., when it is removed from the heat and kept tightly covered for half an hour. The milk bottles are then taken out and kept in a cool place. The milk may be used any time within twenty-four hours. A temperature of 150° maintained for half an hour is sufficient to destroy any germs likely to be present in the milk, and it is found in practice that raising the temperature to 155° and then allowing it to stand in the heated water for half an hour insures the proper temperature for the required time. The temperature should not be raised above 155°, otherwise the taste and quality of the milk will be impaired.

"The simplest plan is to take a tin pail and invert a perforated tin pie-plate in the bottom, or have made for it a removable false bottom perforated with holes and having legs half an inch high, to allow circulation of the water. The milk bottle is set on this false bottom, and sufficient water is put into the pail to reach the level of the surface of the milk in the bottle. A hole may be punched in the cover of the pail, a cork inserted, and a chemical thermometer put through the cork, so that the bulb dips into the water. The temperature can thus be watched without removing the cover. If preferred, an ordinary dairy thermometer may be used and the temperature tested from time to time by removing the lid. This is very easily arranged, and is just as satisfactory as the patented apparatus sold for the same purpose."

THE CEREAL FOODS AND THEIR USES. — The fact that nature provides an animal food for the human infant, and the

further fact that all vegetable foods contain more or less starch, which is not found in milk, and which does not, and cannot, enter into the organism as starch—these facts are on the face of them prohibitory, when considering their availability as a substitute for human milk. Physiology teaches us that before starch can be assimilated, it must be transformed into dextrin, or grape sugar. It cannot take part in the economy, until this change is effected. As starch, it is, when taken into the blood, a foreign and useless element. Physiology teaches furthermore that in adult digestion this transformation of starch into grape sugar is effected by the digestive juices, with which it comes in contact between the mouth and the colon. The saliva begins the transformation and the pancreatic and the intestinal fluids perfect it. But the secretions of the infant are everywhere feeble, and metabolic changes are effected with difficulty.

It is not until the infant is a year old or more, and is in possession of eight or ten teeth, that the saliva has the power of effectively operating on starch, and the pancreas, which is quite diminutive at birth, does not reach its full proportionate size until second dentition is well advanced. Digestion of starchy substances is therefore, prior to this period, a matter of difficulty and oftentimes an impossibility. There is a great variety of baby foods manufactured by enterprising firms, whose object is to present a cereal substitute for human milk, that shall supply the infant's system with all the requisites for full nutrition in a form adapted to its delicate powers of digestion. These foods will be discussed further along. For the present, suffice it to say that the grains mostly employed in their manufacture are barley, oats and wheat, whose digestibility ranks in the order named. Where a domestic food is desired—that is to say, "home made"—a very good one is well-cooked barley added to boiled milk. The "prepared" or "pearled" barley, is the proper article to be used. A tablespoonful of this should first be boiled in from four to six ounces of water for about thirty minutes and then strained through a linen cloth. For very young infants the quantity of water should be six ounces and for older ones, say from four to six months, three ounces. This decoction should then be added to an equal quantity of boiled and skimmed cow's milk, together with a pinch of salt and a little sugar. If the milk has not been previously neutralized, as heretofore directed, a few grains of bi-carbonate of soda should be added.

This preparation should be given at a temperature of 85° or 90° Fahr., and for infants under six months old should be served through a nursing bottle with a black or brown rubber tip. The white rubber tips are unfit for use on account of the chem-

icals used in bleaching them. The best nursing bottle is a common flat glass bottle with just enough rim around the neck to hold the tip securely. Care should be taken to select a tip with perforations large enough to permit a free flow on suction, but not large enough for any considerable flow otherwise.

To insure perfect cleanliness, two bottles and corresponding tips should be provided, and the ones not in use, should be kept in a moderately strong solution of bicarbonate of soda—a teaspoonful to a cup of water. No patent nursing bottle, with a glass or ivory stem extending into its interior, should be employed, as it cannot be kept clean.

In some cases oatmeal may be beneficially substituted for barley in the above decoctions, especially where there is a decided tendency to constipation.

It will be found that barley water is better borne by infants with a delicate stomach, while oatmeal is a slightly heartier food and requires a stronger digestion to assimilate it. It must be understood that the real object of adding any of the cereals to milk is not so much to increase its nutritive properties nor to add anything to its tissue-making elements, but to *increase the digestibility of the milk curd.* It cannot be too often repeated that the great trouble which infants encounter in digesting cow's milk is due to the firmness and coarseness of its coagula. Whatever combines with these caseous masses and renders them finer promotes their digestion. Dr. Jacobi speaks in very high terms of gum arabic for this purpose. He says: "Looking for a substance, which, while fulfilling this object, is absolutely indifferent, from a chemical and physiological point of view, it is gum arabic. Its decoction, therefore, as it is not influenced by the digestive liquids and is not absorbed, acts mechanically only. If I meant to write a eulogy on gum arabic, I should add, that its unpretending and unaggressive nature renders it particularly fit for an addition to children's food, when, in more advanced years also, their irritated intestines require a soothing addition to the necessary nutriment. With the casein of this mixture the gastric juice will get into very slow contact indeed, thus producing a looser, because a more gradual and interrupted coagulation, on which the digestive liquids and the peristaltic motion of the stomach have a better opportunity to exert their influence." He directs that a small quantity of this thin and transparent mucilage be added to boiled cow's milk, which has been skimmed and to which has been, or should be, added the proper quantity of sugar, salt and soda. We have had no experience with this ourselves, but the authority of Dr. Jacobi is ample evidence of its utility.

Instead of gum arabic, Messrs. Meigs and Pepper use gelatin

by preference, and their formula is indorsed by other high authorities. We have ourselves found it very serviceable in cases where other foods have failed and we can surely give it credit for saving one infant's life where previously we had tried nearly every other preparation without success.

The length of the formula, and the necessity of extreme accuracy in measuring its component parts, renders it objectionable, for few mothers or nurses are willing to go to the requisite trouble or are too careless to make its preparation successful. The author's formula is as follows: Dissolve a small quantity of prepared gelatin or Russian isinglass in water to which is added milk, cream and a little arrowroot, or any other farinaceous substance that may be preferred. A scruple of the gelatin (or a piece two inches square of the flat cake in which it is sold) is soaked for a short time in cold water, and then boiled in half a pint of water until it dissolves—about ten or fifteen minutes. To this is added, with constant stirring, and just at the termination of boiling, the milk and arrowroot, the latter being previously mixed into a paste, with a little cold water. After the addition of the milk and arrowroot, and just before the removal from the fire, the cream is poured in, and a moderate quantity of loaf sugar added. The proportions of milk, cream and arrowroot, must depend on the age and digestive power of the child. For a healthy infant within the month, we usually direct from three to four ounces of milk, half an ounce to an ounce of cream, and a teaspoonful of arrowroot to a half pint of water. For older children, the quantity of milk and cream should be gradually increased to a half or two-thirds milk, and from one to two ounces of cream. We seldom increase the quantity of gelatin or arrowroot.

This food is especially recommended for infants suffering with diarrhea, colic and vomiting, and who cannot retain milk and water or cream and water.

Wheat flour may be used for this same purpose, and, when properly prepared, makes an admirable baby food, as we have often demonstrated in our personal experience. A pound or two of ordinary wheat flour is placed in a muslin bag, and boiled for four or five hours in water sufficient to cover it—the longer the better; it should then, without removing the bag, and after being drained dry, be placed in an oven and baked into a hard lump. When thoroughly baked through, the muslin covering should be removed and the ball grated as wanted into flour. This flour may now be added to the boiled milk in quantities according to the age of the infant.

Some years ago, Dr. Churchill, of Dublin, suggested a food made out of stale bread, which he called bread jelly, and which

is admirably adapted to educate a child's stomach up to a point where it can digest cow's milk. He prefers bread made out of "seconds" flour, as this is richer in proteid and phosphates than that made from the finer flours. A thick slice of this bread—about four ounces—two or three days old, is placed in a basin of cold water and allowed to soak for six or eight hours. It is then taken out, and all the water squeezed out of it. The object of this first soaking is to clear away the lactic acid formed in fermentation, and all other deleterious matters. The pulp is then placed in a pint of fresh water, and gently boiled for an hour and a half. The object of this prolonged boiling is to thoroughly break up the starch corpuscles, and to promote the change of starch into dextrin and grape sugar. The thick gruel thus made is strained, rubbed through a fine hair sieve, and allowed to grow cold, when it forms a fine, smooth, jelly-like mass. This should be prepared freshly each night and morning, for it will not keep long. Enough of the jelly is then mixed with warm water, previously boiled, to make a food of the consistence of thin cream, so as to pass readily through a nursing bottle. This means about one full tablespoonful to eight ounces of water. A little white sugar may be added. This is very weak food and wanting in almost every element of full nutrition. It is, however, easily brought up to a high nutritive standard by adding some animal element, such as boiled milk, if milk is tolerated, and if not, by adding instead raw-meat juice and cream, the latter to supply its notable lack of fat. There may be added to each bottle as needed in the proportion of four to six teaspoonfuls of raw-meat juice and two teaspoonfuls of cream. Care should be taken that everything entering into this concoction should be fresh, or serious trouble may follow. Raw meat is especially liable to undergo decomposition.

THE COMMERCIAL BABY FOODS.—The care necessary to properly prepare a domestic infantile food, and the ignorance and inexperience of both mothers and nurses are so widespread, that numerous efforts have been made to meet the wants of universal babyhood by manufacturing these foods on a large scale and placing them on a stable and satisfactory commercial basis. Many physicians object to these preparations on various grounds, and insist that the home product is every way preferable. We cannot agree with this idea. Because an article of wide consumption is made a matter of merchandise, it certainly does not follow that its preparation is lacking in uniformity, or that less care is taken in the making than otherwise. On the other hand, the manufacturers have the strongest incentives in

the world to produce not only the best food that science can devise, but to maintain the integrity of its standard of excellence. They are necessarily provided with machinery and appliances for its manufacture, and experts to superintend every step of its evolution. They have experienced buyers to select the materials which enter into its composition, and means at their command to get the best the markets afford. The rivalry between the different foods for supremacy, is alone sufficient to insure uniformity of grade and perfection of output.

Their attention is not diverted every few moments from the work in hand to something entirely foreign. They are not distracted at a critical moment by a crying baby, or wearied by night-vigils into forgetfulness of formula. It is their sole business to bring about the best results, and if their advertisements are sometimes exaggerated in statement, it is the business and the duty of the physician to inform himself of the true merits of the case and to act accordingly. It is unreasonable to suppose that all of the patent foods are of equal value, and equally absurd to regard them as devoid of merit or a fraud upon the public.

For convenience of comparison and in order to form an intelligent idea of the relative nutritive value of these foods, Professor Leeds, of Stevens Institute, has made a classified analysis of the principal ones used in this country, dividing them into three classes as follows:

Farinaceous foods, viz., Imperial Granum, Ridge's Food and various "wheat foods" and "barley foods;" the so-called Liebig foods, viz., Mellin's, Horlick's and Hawley's; milk foods, viz., Nestlé's, Gerber's and the condensed milks.

FARINACEOUS FOODS.

	1. Blair's wheat food.	2. Hubbell's wheat food.	3. Imperial granum.	4. Ridge's food.	5. "A.B.C." Cereal milk.	6. Robinson's pat. barley.
Water	9·85	7·78	5·49	9·23	9·33	10·10
Fat	1·56	0·41	1·01	0·63	1·01	0·97
Grape sugar	1·75	7·56	Trace.	2·40	4·60	3·08
Cane sugar	1·71	4 87	Trace.	2·20	15·40	0·90
Starch	64·80	67·60	78·93	77·96	58 42	77·76
Soluble carbohydrates	13·69	14·29	3·56	5·19	20·00	4·11
Albuminoids	7·16	10·13	10·51	9·24	11·08	5·13
Gum, cellulose, etc.	2·94	Undet'r'd	0·50	...	1·16	1·93
Ash	1·06	1·00	1·16	0·60	...	1·93

LIEBIG FOODS.

	Mellin's.	Hawley's	Keasbey and Mattison's.	Savory and Moore's.	Baby sup No. 1.	Baby sup No. 2.
Water	5·00	6·60	27·95	8·34	5·54	11·48
Fat	0·15	0·61	None.	0·40	1·28	0·62
Grape sugar	44·69	40·57	36·75	20·41	2·20	2·44
Cane sugar	3·51	3·44	7·58	9·08	11·70	2·48
Starch	None.	10·97	None.	36·36	61·99	51·95
Soluble carbohydrates	85·44	76·54	71·50	44·83	14·35	22·79
Albuminoids	5·95	5·38	None.	9·63	9·75	7·92
Gum, cellulose, etc.	...	...	...	0·44	7·09	5·24
Ash	1·89	1·50	0·93	0·89	Undet'r'd	1·59

MILK FOODS.

	Nestlé's	Anglo-Swiss.	Gerber's	American-Swiss.
Water	4·72	6·54	6·78	5·68
Fat	1·91	2·72	2·21	6·81
Grape sugar and milk sugar	6·92	23·29	6·06	5·78
Cane sugar	32·93	21·40	30·50	36·43
Starch	40·10	34·55	38·48	30·85
Soluble carbohydrates	44·88	46·43	44·76	45·35
Albuminoids	8·23	10·26	9·56	10·54
Ash	1·59	1·20	1·21	1·21

It will be seen at a glance that all of the farinaceous foods, of which Imperial Granum may be taken as the type, and the "milk foods," of which Nestlé's is the best representative, the starch is unchanged, and this fact renders all of this class of foods unfit for very young infants or those with feeble powers of digestion. For infants of strong digestive powers, however, and for those in whom age has developed the peptic juices to an adequate extent, these foods are valuable and reasonably reliable. The farinaceous foods are notably lacking in fats, but are sufficiently rich in albuminoids. The want of fat and also of sugar should be corrected in administering these foods.

The other class of foods is much better adapted to very young infants, for the reason that in the preparation of them the starch which they contain is to a greater or less extent converted into dextrin or maltose, and their digestibility thereby greatly facilitated.

The maltose or grape sugar is the ultimate end which all

starch must reach before it can be assimilated, and it is this transformation of starch into sugar that most troubles the young infant, in its attempt to digest artificial foods. This food was suggested by Liebig many years ago, and consists mainly in mixing malted barley meal with wheaten flour, and adding an alkali, either potash or soda. Under a certain amount of heat the diastase of the malt acts on the wheaten flour and changes it into dextrin, then into maltose and then into grape sugar. This is in strict accord with physiological requirements. The process of converting the starch into grape sugar artificially is not weakening or demoralizing to the infant's stomach, since the diastase of the malt only does for the child what the mother herself does, viz.: converts starches and sugars into lactin before they are supplied to the child in the mother's milk.

The best representative of this class of foods is that known as Mellin's, and this we have used in our practice for some twenty years with unabated satisfaction. Mixed with a due proportion of boiled (sterilized) cow's milk this food has met the requirements of more infants than any other food with which we are acquainted.

Mellin's food possesses one great advantage over other artificial food preparations. By adding it to milk in varying proportions the alvine evacuations can generally be regulated with great nicety. When the bowels are too loose more milk should be added, and when there is a tendency to constipation this can be remedied by lessening the quantity of milk and giving the food nearly or quite clear.

MEAT PREPARATIONS.—There seems to be a great diversity of opinion upon the nutritive properties of the various patent meat extracts, beef essences and juices, with which our markets are flooded. The manufacturers and vendors of these products are more actuated by a desire to utilize in a profitable way the waste materials of the stock yards than to meet a living demand in a scientific way. The weight of authority and of clinical experience seems to be against them. The action of heat to which they are subjected in course of preparation coagulates the albumen in which they are none too rich, and furnishes too large an amount of extractives of low nutritive value. Beef tea, however made, is a very poor food for children and should never, for any great length of time, be depended upon alone. Its laxative character prohibits it in diarrhea. The same may be said of veal, and chicken broth.

Raw-meat juice is, however, of great value, and may be used as a substitute for the casein of cow's milk. In sickness, when but little food is tolerated by the stomach, raw-meat juice can

be given in small quantities with great benefit. The best way to prepare this is to get a pound of the round of beef and have it ground through a machine. After being heated over a quick fire, the juice should be squeezed out with a strongly made lemon squeezer. A good juicy piece of beef ought to yield nearly an ounce and a half of juice to the pound of meat. Another method of securing the same result is to place a thick piece of raw beef in a proper receptacle over a hot fire for a few moments and then press out the juice with a potato masher. The amount of juice yielded in this way is very much less than by the previous method. The red, platter gravy, which exudes when a piece of roast beef is cut, can also be made available. The juice of raw or nearly raw meat (beef), however it may be secured, can be added to milk or to cream, and is a very valuable addition thereto. There is nothing more digestible and nothing more nutritive.

GAVAGE (FORCED FEEDING).—As a means of controlling obstinate vomiting in the acute, wasting diseases of infancy and childhood, Dr. L. Emmett Holt has recently suggested the employment of gavage. The process of using is simple and worthy of consideration in cases where ordinary feeding has proven unsatisfactory. Dr. Holt says: *

"During the past two years gavage has been in daily use in three institutions with which I am connected, the Babies' Hospital, the Nursery and Child's Hospital, and the New York Infant Asylum. Our experience has now extended to observations upon upward of four hundred cases, in most of which gavage has been repeated many times. It has been tried in almost every variety of acute disease in infants and small children, and has won its place as one of the most valuable of our therapeutic measures at this time of life.

"The technique of gavage is very simple. The ordinary apparatus used for stomach-washing is all that is required, viz., a funnel, eighteen inches of rubber tubing, a soft rubber catheter, and a few inches of glass tubing for connection. The catheter should have a double eye. No. 14, American scale, is the best size for infants under six months, and about No. 17 for older children. A four-ounce funnel is large enough for infants, while for older children it is an advantage to use one holding six or eight ounces. The child is placed flat upon the back in its crib, and the head steadied by an assistant. The tongue is depressed with the left forefinger, and the catheter, previously oiled, is pushed rapidly down the pharynx until nine or ten inches have

* New York Medical Record, April 28, 1894.

passed the lips. The funnel is now raised high in the air for a few moments to allow gas from the stomach to escape. The food is poured into the funnel and rapidly runs into the stomach. As the last of the food leaves the funnel the catheter is tightly pinched and quickly withdrawn. This last step is an important one, in order to prevent trickling of food in the pharynx, which may provoke vomiting. Sometimes the food remains in the funnel, and will not run into the stomach. This is not ordinarily from blocking the eye of the catheter by mucus, but from gas in the tube. In a few moments this generally rises to the surface of the liquid, and then the food flows readily. If regurgitation of the food takes place, it is generally immediately after withdrawing the tube. In many cases it may be prevented by allowing the gas to escape from the stomach before putting the food in, and in others by holding the jaws separated for a few moments after the catheter has been withdrawn.

"In young infants no gag is required, but in older children one is quite necessary, since otherwise they may bite the catheter in two. Where a gag is needed the ordinary one accompanying intubation sets will answer the purpose. Two assistants are usually required to feed an older child. It is important that the child should be held flat upon its back.

"The time consumed in feeding by gavage is from ten to thirty seconds. In infants this is very easily done. In the institutions referred to all the nurses have been taught to do it, and they learn with very little experience to do it very quickly.

"The uses of gavage may be briefly stated as follows:

"1. In premature infants its value has been well established on the continent of Europe, in connection with the use of the incubator. As yet we have had but little experience with it in this country.

"2. It is useful in controlling persistent vomiting in very young infants, where the vomiting occurs partly from habit and partly from exaggerated pharyngeal reflex. Dr. Kerley's published paper established this point conclusively, and subsequent experience has confirmed his observations. Dr. R. B. Kimball, attending physician to the Summer Branch of the Babies' Hospital, is soon to publish a large number of cases treated in the summer of 1893, also confirmatory of this point. I will not enlarge upon it.

"3. In acute diseases, where for any reason children refuse all food, or struggle violently against everything that is offered them. In very many cases of severe illness in children from two to five years of age, the point is reached, after four or five days have passed, when the child absolutely refuses to take any-

thing, and nothing is gotten down excepting by holding the nose. This is, to my mind, one of the most promising fields for the application of gavage. In very severe cases of scarlet fever, diphtheria, broncho-pneumonia, typhoid, and empyema just this necessity is felt.

"4. In serious brain disease, where the patient cannot be fed by ordinary means. This may occur in tubercular meningitis, chronic meningitis, and in many other diseases where delirium or coma is a symptom. Life is not only prolonged, but existence made more tolerable, and the patient is much more easily cared for by the attendants.

"A few illustrative cases will serve as types of many: A child, aged three, with chronic meningitis, was fed for six weeks by gavage; by no other means could anything be gotten down excepting by the expenditure of a great deal of time, struggling, and holding the nose.

"A child, aged two, with empyema and very marked asthenic symptoms, after two weeks' illness absolutely refused everything in the way of nourishment, and was in danger of dying from inanition. For two weeks all food was given by gavage, at the end of which time the child was able and willing to drink its milk from a cup, and take stimulants without difficulty.

"A private patient, aged twenty months, with double pneumonia and very marked prostration, had reached the point, by the tenth day, when almost nothing could be done in the way of nutrition. After gavage for two days the temperature gradually fell, the patient was able to take food naturally, and made an excellent recovery.

" In a recent case of tubercular meningitis seen in consultation in private practice—the case was hopeless for five days before death—all the food was given by gavage. After the case closed, the attending physician said, 'You have no idea what a comfort the gavage was to the family.' This was especially noticeable after the struggles to give food which had preceded its use.

"A recent case of diphtheria in private practice in a little girl aged five affords a striking illustration of the benefit of this means of treatment. The patient was delirious, profoundly septic, temperature 105° Fahr. and over for a week; pharynx, tonsils, uvula, palate, aud part of the mucous membrane of the mouth covered by pseudo-membrane. In the words of Dr. O'Dwyer, who saw the case, 'the symptoms were about as bad as they could be.' After the fifth day, to give either food or stimulants by ordinary means was absolutely impossible. She was being worn out with the constant teasing and forcing. Even at the risk of heart failure three nurses held her while I employed gav-

age for the first time. Not more than three ounces of food had been gotten down in the course of the previous twelve hours. Four ounces of food and one ounce of brandy with digitalis were given without difficulty, and with but little more disturbance than was necessary to make the child swallow a tablespoonful. From this time on gavage was practiced regularly every six hours; the amount of food was gradually increased until eight ounces at a time were given at once. This was kept up for a week; not once was the food regurgitated, and the case made a complete recovery. In my own opinion the life of the patient was saved by this means.

"To cite further cases is unnecessary; enough has already been said to show that gavage is easy, simple, and free from danger, and a very great resource in these very difficult cases.

"In the adult when food is refused by the stomach we may have recourse to the rectal alimentation; but in little children this is extremely unsatisfactory, and in most cases is an entire failure. As compared with holding the nose, and forcing the child to swallow, anyone who has seen the two things done will, I think, have little difficulty in deciding which is easier.

"In most of the cases to which I have referred the food given has been completely peptonized milk, diluted according to the age of the child; but for infants our hospital milk and cream mixture in proportions suitable to the child's age. Stimulants, medicine, everything that is to be given may be poured in at once.

"In older children, where six or eight ounces at a time are given, gavage need not be repeated more than once in five or six hours. In infants the intervals should be one hour longer than the customary interval of feeding.

"Stomach washing is required in conjunction with gavage in most cases in infants; once at least every day the stomach should be washed before feeding.

"In conclusion I can only say to those who are unfamiliar with this therapeutic measure that a careful trial will convince anyone of its very great value."

RECAPITULATION.

1. Human milk is the only *natural* food for human infants, all other foods being "alien," "artificial"—mere substitutes.

2. The only reliable test for human milk, as also for all substitutes, is the practical one of *experience*.

3. Cow's milk is practically the best substitute for breast-milk, but should never be given to young infants in its raw state—always boiled, parboiled or "sterilized."

4. The cereal foods should never be given for any considerable length of time, except in combination with milk.

5. The real object of adding cereals to milk is not to add to its nutritive properties, but to increase its digestibility.

6. This they accomplish by prolonging the digestive act and preventing too rapid coagulation into large masses of coarse curd.

7. The cereals best adapted for infant diet are barley, oats and wheat.

8. When prepared by domestic processes, they should be thoroughly cooked until the starch they contain is more or less transformed into maltose.

9. Gum arabic, gelatine, or any other bland and unirritating substance may be added to milk with the same end in view.

10. All artificial infant foods should be given at the body temperature, 100° Fahr., and through a clean nursing bottle.

11. Regularity in feeding is every way essential.

12. As soon as an infant has half a dozen teeth its diet should be liberalized, *i. e.*, varied so as to stimulate the development of the peptic glands and increase the digestive powers.

CHAPTER VI.

NURSERY HINTS.

SANITARY science, which has done so much for the mother, has done but little, if anything, for the baby. Antiseptic midwifery has rid the lying-in room of much of its sufferings and most of its dangers. But the nursery is still the home of diarrhea, colic, and other preventable diseases, which are or should be a reproach to scientific medicine. Ophthalmia neonatorum will never be found in a well-ordered nursery, where proper cleanliness is observed ; and all forms of stomatitis are directly traceable to a lack of care in the management of the infant's diet.

A babe which is properly bathed, and whose skin is kept in a healthful and natural condition, should never have eczema. There will be space here for only a few hints regarding the baby's home and its sanitary treatment. If pages were written until they were multiplied into chapters, and these chapters into books, the gist of the whole thing could be summed up in two words—*perfect cleanliness.*

In the ideal nursery every necessary and portable utensil should be duplicated, so that when one is in use, another is being sterilized or rendered aseptic by approved methods. This applies to the teaspoon, the nursing bottle, and the crockery. The baby's linen and the diapers should receive special attention, and be washed and dried with more than ordinary care. When possible, the antiseptic properties of sunshine should be utilized to its fullest extent in this connection. The infantile "boss of the home," should not only have the freshest of milk, and the best the house affords in the way of dietetics, but scrupulous, excessive care should be exercised to exclude from his surroundings everything calculated to irritate the hypersensitive skin, or poison the atmosphere surrounding his sensitive and susceptible organism. If half the care, forethought and expense were given to the rearing of human beings that is usually deemed necessary in the breeding and rearing of stock, the mortality of infants under five years of age would soon drop below the humiliating figure of fifty per cent.

The only two points necessary to dwell upon here relate to washing and dressing the infant. Many mothers make

hard work of both proceedings, because they do not know the better way.

THE BABY'S FIRST TOILET.—A new-born baby is covered with four substances,—amniotic fluid, mucus, blood, and vernix caseosa. The first three of these are easily wiped off when the baby is just born, the last can best be softened and removed by warm sweet oil. So immediately rub him clean of the first three substances, and oil him from head to foot with the warm sweet oil, being careful to rub with the palmar surface of the hand and fingers, in the groins, armpits, and dorsum where this white wax is most abundant. Wiping this oil and vernix off leaves the skin as soft as velvet.

Dress the navel with absorbent cotton, instead of burnt linen, as was the old custom, adjusting a plain, unhemmed band about five inches wide just tight enough to retain the navel dressing and still be entirely comfortable to the baby.

Fig. 1

After adjusting the diaper, the dress should receive attention. The evolution of a more humane and physiological dress for the baby has created much interest. To-day the Gertrude baby dress is the most comfortable and healthy, as well as the most admired infant costume extant. It has received the encomiums of many distinguished physicians in this country and abroad, as well as the kindly mention of thousands of mothers. Said a happy mother in a letter to the author, "I have never had the pleasure of seeing you, but my baby has been in the Gertrude suit for eight months and if you have done nothing else in your life but give this suit to the babies, you may still count your life a success."

THE GERTRUDE SUIT.*—The undergarment (see Fig. 1) is made of some warm, soft, fleecy material, and reaches from the neck to the wrists, and to eight or ten inches below the feet.

* Patterns for the Gertrude Suit (five in a set for $1.00) can be had of Gross & Delbridge, 48 Madison street, Chicago.

The hems and seams are turned upon the outside so that it is soft and fleecy within.

The second garment (see Fig. 2) is of the same shape as the other, with the same princess curves, but without sleeves. It is an inch larger than the other one, so as to fit over it comfortably. The armholes are pinked or scalloped, but not bound, so as to be easy and comfortable to the baby. This middle garment is made of baby flannel.

The dress (see Fig. 3) is of any material you like, warmer in

Fig. 2.

Fig. 3.

winter and cooler in summer, but of the same shape, only slightly larger so as to fit comfortably over the others. This may be made as simple or as elaborate as you please.

These three garments are put together before dressing,—body within body, and sleeve within sleeve. After diapering the baby, the suit is put over its head as one garment, the little bare arms going into the sleeves without friction or fretting. Tie and button behind, and the baby is dressed with one pin instead of fifteen. Each garment has a draw-string tie at the neck to make it fit a baby of any size. These tie strings should be of different colors, so as not to mismatch in tying.

The back of each garment is opened downwards about five or six inches, and in the middle of this space is one button, so that each garment has a tie and one button only.

Never put two buttons on the baby's dress where one will serve. Reduce the drudgery of motherhood at every point, remembering the two governing principles in all this work for our babies and their mothers,—namely, health to the baby and ease for the mother.

The nightgown, of some soft and warm material, is made just like the undergarment in the suit (see Fig. 1). This and the diaper is all the baby wears at night.

The diapers are of canton flannel and are of two sizes, the hems being upon the outside and turned down but once. The larger one is eighteen inches square and the smaller one ten inches square. This smaller one is so adjusted upon the larger, that when soiled, we have a small diaper to wash instead of a large one.

THE DAILY BATH.—Some excellent physicians to-day are sharply criticising the daily bath, and charging it with many of the ills of infant life. It is undoubtedly true that the old bath, so tedious and fatiguing to the mother and so unpleasant and exhausting to the child is a species of refined cruelty that should be relegated to the things of the past. I am aware that it is easy to find fault with old customs, and not always easy to give the world something better; but if the bath is properly given, we have something eminently healthful and easy to put in practice. I would give young mothers specific directions in this matter.

Make all preparations for the bath complete before touching the baby. Place upon the carpet, a little in front of the fire, a rubber sheet a yard or more square. Upon this an infant's bath tub, half full of water at the proper temperature, say 92 to 98 degrees, but the mother's instinct will guide her as to what will please the baby in this matter. A soft sponge or wash cloth is thrown in the water. "What soap shall I use?" Not any for the first two years.

The lye which is the bottom fact in all soap without exception is unkind to a young baby's skin, and it is most unkind where that skin is the thinnest, behind the ears, in the fat folds of the neck, under the arm-pits, and about the privates. Since abandoning the use of soap, excoriations are a thing of the past. You can make a baby perfectly clean with pure water and the skin will be as soft as velvet. There is an oily, sebaceous nourishment to the skin from within, rendering it soft, pliable and beautiful, and this the lye of the soap seeks out, leaving the

skin dry and harsh. Pure water will remove the dirt, without disturbing this natural dressing.

Now place two chairs between the bath tub and the fire. Over one of these place the Gertrude suit all nicely adjusted. Over this a soft towel. Over the other chair place a receiving blanket (a woolen blanket with a canton flannel one inside), these two while getting thoroughly warm will keep the heat from you while giving the bath. Fold the diaper diamond shaped, put an old rag in it, roll it, stick a pin in it, place it around behind the chairs on the warm hearth.

Now, having everything ready, take the baby from the crib, remove the night-gown and diaper, for that is all the baby wears at night. The bandage, the shirt, the pinning-blanket, the skirt and double-gown are a bit of refined cruelty in baby's preparation for sleep. You could not sleep with all this cumbersome clothing. Do not ask your baby to. Let it have the same delightful freedom which you enjoy when resting.

With the naked baby in your hands, kneel upon the right knee by the bathtub, lay the baby all over in the water, save the face, the head resting for safety in the palm of your left hand. With the free right hand take the sponge, and begin always at the top of the head. Bathe the eyes, ears, nose, mouth and neck, the chest, the armpits, and the privates thoroughly and so down to the feet. Now turn the baby over, his chest resting upon the palm of your left hand, holding it high enough to keep the nose and mouth out of water. Then with the free right hand take the sponge, and again begin at the top of the head, bathing successively the back of the head, the neck, the shoulders, across the kidneys, and so down to the feet. In this way you know where to begin and know when you get through. You have bathed the little one thoroughly from head to foot without repeating yourself or leaving any parts untouched.

Set the baby up in the end of the bath tub and draw on to your lap from the second chair, that now warm receiving blanket, place the baby in it, wrapping it closely to the neck, tucking some portions of the inside blanket under each arm and between the limbs. From the first chair take the warm, soft towel and wipe the face, head, and neck, take the brush and part the hair, thus making the toilet complete to the neck, before exposing the body. Now set the baby up on your lap, and let the blanket fall nearly to the hips, and lo! baby is all dry; but a little brisk rubbing with a towel or the palm of the hand, will make a bright glow upon the skin and rouse capillary circulation.

Now take the Gertrude suit all warm and comforting from the first chair, place it all over baby's head at once, put the

arms in, tie and button behind, and the baby is dressed to the hips and without a pin. Lay the little one down upon your lap as if to diaper it, and now for the first time expose the bottom and limbs, and they too are all dry, but apply a little brisk rubbing as before, then reach around the chair and get that warm diaper on the hearth and put it on and your task is done —beautifully and healthfully done. You have bathed and dressed your baby easily in seven minutes instead of forty—the time which the average nurse and mother consume in this task.

What are some of the advantages of this over the old bath? Let us see. In the first place you have saved each day a half-hour of exhausting work, making one hundred and eighty-two and one-half hours saved in the year, simply by learning to do one motherly duty right instead of wrong. Secondly, it means that you have changed a trying and exhausting duty into a mere frolic, highly pleasurable to both you and the baby. Thirdly, this bath has a wonderfully quieting influence. Often when called to children in convulsions, I have placed them in a quite warm bath, when they would return to consciousness almost immediately. Now, if this warm full bath is so soothing as to take a baby out of a convulsion, the most nervous state in which it is ever found, it must be very tranquilizing. And so we find it. This bath makes a baby happy, full of smiles, dimples and fun all day long, while the old bath and dressing has a tendency to make him irritable.

When shall we bathe the baby? Daily, and always on an empty stomach. A good time is just before the second nursing. When we remember how essential to high health is a soft, velvety skin; how that every pore is a minute sewer, and that the skin itself is a displayed lung, helping to oxygenate the blood, we shall appreciate the value of a daily bath.

SLEEP; WHAT IT MEANS TO BABY, AND HOW TO SECURE IT.

One of the great specialists of the land regards sleep as a conservator of high health, and says it will do much, both to prevent and cure nervous diseases; that if he could get into our great insane asylums, and, by any fair means, induce the inmates to have eight hours of sweet sleep at night and one hour during the day, he would soon send the bulk of them home cured. So much does he think of sleep as a preventive and panacea for nervous diseases. I quote him, not because he is peculiar in his views, but because he voices the best thought of the best men in the profession.

A large proportion of the diseases of infancy are nervous

diseases. Look at all the cramps and convulsions so common in early life; look at whooping-cough, meningitis, basilar and cerebro-spinal; think of the crying spells, the insomnia, the starting from sleep at the slightest noises.

If the diseases of infant life are nervous diseases, and sleep will prevent and cure them, how important it is to sleep the baby abundantly. "But," says the young mother, "the more baby sleeps, the better I like it; you won't catch me waking baby when she is sleeping sweetly." That is all right as far as it goes, but she must learn to conserve baby's habits of sleep.

How? First, remember the necessary conditions of rest the world over, namely, darkness and quiet. The lamp burning all night spoils the first condition, and the frequent hovering over the little one, defeats the second.

Secondly, have regular hours for sleep. When six o'clock comes, the good wife undresses the baby as naked as it was born, rubs it with a Turkish crash towel, puts on a diaper and nightgown, nurses it, and puts it to bed. This is a finality; it does not get up in five minutes, or one hour, or two hours. It never has been taken up, and does not know that such a thing is possible, so it never cries to get up.

After a second nursing each day it goes to bed for a two-and-a-half hours' nap. How do you get your baby to sleep? Do you sing to it, or rock it, or walk with it? By no means! We put it in the crib, kindly cover it, and let it go to sleep when it gets ready. It kicks up its heels, plays with its pink toes, and soon drops off to sleep.

To be in the highest health, babies should sleep all night like other people, and this should be taught them the first week of their lives, by simply letting them alone. The bandage, shirt, pinning blanket, skirt, and double gown are discarded. You could not sleep with all this load of clothing, nor can the baby.

When put to bed after the last nursing, let it absolutely alone until six o'clock in the morning. But what shall I do if it cries? It will not cry, it has a healthy father and mother, it has a good supper, it has a nice warm nest to lie in, it is a reasonable baby and will not cry for nothing. "But," says the nurse, with a wise shake of the head, "babies will cry sometimes." Yes, kittens mew, dogs bark, and colts whinny, but no hurt comes to them from these healthful exercises. They do not rupture, nor will the baby, grandmother to the contrary, notwithstanding. If you pick that little one up to-night, you will have to to-morrow night, and if you pick it up to-night and to-morrow night, the mother must do it three hundred and sixty-five nights, and she should not be thus punished for

being a mother. This is a perfectly easy thing to do if you begin the first night, and you can teach the baby to sleep all night, like other people, before it is a week old. What a blessing this habit is to mother and child, only those know who have tried both ways.

Baby's crib should be open work, to allow ventilation. The mattress of hair should have over it a pilch and a sheet. What kind of a pillow shall we have? Well, let us have a pretty pillow, with a lace border and a blue ribbon run in about the edge to put into the crib when baby is not there. What, can't I have a nice, downy pillow for my baby to sleep on? Well, I will tell you something, and then you may decide for yourself.

Baby is put into a crib with a soft, downy pillow, it settles down, sleeps soundly, the room is warm, and when it wakes, it is all wet behind the ears and back of the neck. It is taken up and carried into the next room to see company, it takes cold and to-morrow you send for the doctor. Again, this elevating of baby's head has a tendency to produce round shoulders. If you would have the baby grow straight and handsome, let him sleep on a straight, flat bed for the first few years. Babies love to lie on their stomachs; this healthful and enjoyable position they cannot assume on a pillow.

The covering of the baby should be light and warm, never burdensome. If you put your hand on the neck, and find it wet with perspiration, you may be sure it is too warmly covered. If at any time during the year you find the baby cross and fretful, stop and think and say to yourself, "Perhaps I am not sleeping the little one as much as I ought to; I will give more attention to the proper conditions of sleep." In this way you will often remedy the whole trouble.

PART II.

DISEASES OF THE EYE AND EAR.

CHAPTER I.

DISEASES OF THE EYE.

THE eyes of the infant should be carefully and thoroughly examined immediately after birth, to determine the probable condition of the function of vision, the presence or absence of congenital defects, and the possible and not infrequent retention of some of the vaginal secretions within the conjunctival sac, on the eye-ball, eye-lashes, or upon the surface of the lids.

The examination thus made may reveal evidence of the infant's eyes having suffered from inflammation, while yet *in utero.* When present such conditions are the result of syphilis, either transmitted from the father direct to the fetus, from the acquired syphilis of the mother, or from heredity of one or both parents. The affections thus occurring frequently destroy the sight, partially or wholly, before birth, and usually leave such objective changes in the eyes as to enable us to determine the part which has been diseased and also the extent of the inflammatory changes.

Following an attack of fetal iritis, we shall find the iris varying in color from that normal blue of all infants immediately after birth, the pupillary opening perhaps blocked with lymph or adherent to the lens capsule, the latter better shown by the immobility of the iris, under the influence of light varying in intensity.

The cornea may present a whitish, opaque appearance, the result of inflammatory changes in its substance, the extent of the loss of transparency presented, together with its location in the cornea, determining a proportionate loss of vision to the infant.

When an inflammation of the choroid has occurred in fetal life, no external expression of it is visible in the eyes until some days after birth, when the wandering or oscillatory movement of the eye-balls indicates to the observant physician, that the function of sight is impaired, and an ophthalmoscopic examination usually reveals changes in the choroid and retinae, suffi-

cient to account for the restless movements of the eyes of the infant in its instinctive effort for better vision. Thus, within its first month of life, in its natural endeavor to find, aside from the impaired central and most sensitive, some other portion of the retina which has been less affected by the choroiditis from which it has suffered before birth, to this apparently choreic motion, the term nystagmus has been given.

The normal visual power of the infant at the time of birth is so far without a standard; yet the function of sight of the new-born child is without doubt a progressive one.

Some years ago in a series of experimental observations upon the infants under the care of Dr. George E. Shipman at the Foundlings' Home, I was able to satisfy myself, that during the first month, the infant has but little vision except that of light perception. The impressions of objects made upon the infantile retina seemed to be absolutely of no value, except as they tended to excite in a general way, the ganglionic cells of the optical area of the cortex which constitutes the visual sphere.

In these experiments, and in the light of later investigations, the observations noted by me at that time, tend to determine the fact, that even in the first weeks of infantile life the excitation of the optic nerve-fibers, resulting from the impression upon the retina of bright lights, and such necessarily undefined forms of objects, which might be projected upon the infantile retina, are at the same time sufficient to excite a stimulus of the ganglionic cells of the optical area of the cortex so as to come within the domain of consciousness and tend toward its development.

In the early life of the infant, I am satisfied that months must pass before any permanent changes may result in the ganglionic area of the cortex, which will enable the child to retain memory pictures of the things seen.

The power of the reproduction of well-defined optical memory pictures is attained ordinarily only after the first or second year of life, and is dependent upon the frequent repetition of the same retinal excitation for the objects seen. As the infant increases in age, the repetition of similar images becoming more frequent and the objects more varied, a rapid development of its power of visual consciousness results, and the increase of the power of reproduction by the memory of those things which the child has seen, follows.

The retina, optic nerve, and the ganglionic cells of the cuneus portion of the brain in the infant, with their imperfect receptive, conductive and absorptive powers, while sufficient to receive perhaps the more or less imperfect image on the retina, and slowly transmit it through the optic nerve to the brain, it

is probable that only a transient impression upon the optical memory cells of the cortex results. Imperfect as the stimulus and its transmission may be at this age, it is at the same time of great value in the excitation of these memory cells, which later have much to do with the mental and even the physical development of the child.

The new-born infant may exhibit, at birth, some of those anomalous conditions of the eyes, which occur from arrested or imperfect development which are classed as congenital defects, which, when present, may have a visual, cosmetic, or surgical value.

To the physician who has conducted the infant into this world without other evidence of monstrosity, there is perhaps, nothing more appalling than the presentation to the nurse, or the mother, of a child without eyes (anopthalmus).

The infant emerging from the inner-world of the mother to the outer-world of light, separates its lids involuntarily for the purpose of stimulating its imperfect retina by the admission of light to further its development. If the lids do not open at birth and thus expose the cornea and pupil to the observation of the physician, he must determine whether the fault lies in an inability to open the eyes because of inervation of the levator of the upper lid (congenital ptosis); or because from arrested development the fissure of the lids has not been completed and their free margins remain united (ankyloblepharon); the latter condition at birth frequently covering the defect due to absence of the eye-balls (anophthalmus); or their imperfect development when the eyes are abnormally small (microphthalmus).

Among the other defects to be noticed are the absence of the eyelids (ablepharon) which occurs only in monstrosities; the displacement of the normal opening of the lids from a horizontal position to an angular one (ectopia tarsi), which gives the child a Mongolian aspect; or when there is a vertical fissure of the lids (coloboma), usually the upper being the one affected, although the lower or even both may exhibit this defect.

Again it may be noticed that one or both lids may be inverted (entropion) or there may be an over-development of the cilia and two lines of eyelashes (distichiasis) be present, the inner row causing irritation of the cornea and eyeball.

Sometimes a redundant fold of skin may show itself at the bridge of the nose, and by its fullness cover the inner canthus of each eye sufficiently to cause a deformity and perhaps interfere with the vision and the opening of the lids. This deformity (epicanthus) may be lessened or dissipated in some cases

by the removal of a vertical elliptical piece of the skin at the dorsum of the nose, and yet if the fold of skin is not too great in flat-nosed children, the deformity may disappear without operation in from four to six years, with the development of the nose bridge.

Vascular naevi or other birthmarks may exhibit themselves and require surgical treatment soon after birth, owing to their extent, or later, when in the judgment of the surgeon their disappearance with the development of the child is not probable.

The presence or absence of the lachrymal apparatus is rarely noticed immediately after birth, and it may be weeks or months later that the congenital defects of imperfect development of the puncta, canaliculus, or lachrymal ducts cause attention by the overflow of tears or the presence of pus or muco-pus at the inner canthus. The lachrymal gland in rare cases is found to be absent or undeveloped; the usefulness of the eye, however, is not necessarily impaired by its absence.

If, as is rarely the case except in lying-in asylums, foundlings' homes, or other similar institutions, a careful examination of the eyes of the new-born is made by a skilled medical attendant, other defects arising from arrested development which impair the sight are often found present in eyes which to the less skilled observer would pass for normal eyes.

The iris may be absent (irideremia), or show a cleft, the fissure being generally below (coloboma of the iris), a displacement of the pupil, inward, outward, upward, or downward (corectopia), or there may be more than one pupil (polycoria), in some cases the abnormal position of the pupil causing both imperfect vision as well as a cosmetic defect.

With the opthalmoscope we look into the interior of the eye and find where nature failed to complete its work for the individual, as in the pupil, which should be free of all obstruction for the purpose of vision, shreds of membrane are seen to stretch across its area (persistent pupillary membrane) and which interfere more or less with the ultimate vision of the infant. It may be found that the lens is not in its normal position and that by some freak of development it is displaced (luxatio lentis congenitalis), or that certain layers of its tissue are opaque and a diagnosis of lammellar or zonular cataract is made. Not infrequently the whole lens is opaque at birth and congenital cataract should be diagnosed.

If the lids, cornea, iris, lens or vitreous are normal, we may find on ophthalmoscopic examination that there may be evidence of arrested development in the posterior portion of the eye, perhaps what is called a persistent hyaloid artery, a blood vessel running from the optic disk to the posterior portion of

the lens, originally intended for the development of the latter, but which failed to be absorbed and thus by its presence interferes with the vision of the eye; or there may be an opening in the choroid (coloboma) which has impaired the development and sensibility of the overlying retina at this portion.

It is not unlikely that we may find in the investigation of the depths of the eyes, that more or less of the optic nerve fibers, which enter the eyeballs through the opening in the sclera, have not been denuded of their opaque sheaths and present to our view a radiating opaque white mass which we have learned to recognize as opaque optic nerve fibers.

In some cases deposits of pigment may be observed upon or around the optic disk, but like the opaque nerve fibers, have no special relation to the visual functions unless the lesion is an extensive one.

In infancy and childhood, there are certain acute diseases of the eye, which require early recognition on the part of the physician, who should be able to diagnose and prognose the condition, even if he does not feel that he can do, from want of experience, what a specialist might. The ophthalmic surgeon is only a specialist because of years of practice confined to his department of medicine, in which he has acquired a knowledge or a technique from the large number of special eye cases which come to him, that the general practitioner cannot avail himself of.

Following the examination of the eyes of the infant as outlined above, if we should find upon the lids, eyelashes, or within the conjunctival sac of the eye any extraneous matter and our search for it should be the more thorough, if we have suspicion or knowledge of a specific disease of the genital organs of the mother, or, if a marked or acrid leucorrhoea exists, the presence of such matter endangering the eyes by possible inoculation. Such conditions, when present in the mother, are too often followed by destructive inflammation of the eyes of her infant.

OPHTHALMIA NEONATORUM, is a term applied to one of the most frequent of the inflammations of the eye in infancy, and is a purulent inflammation of the conjunctiva of the new-born child. It is a disease which is usually violent in its outset and rapidly destructive of sight.

While in the last few years, although scientific medicine has reduced the percentage of blindness resulting from it, from seventy to thirty-five, it still furnishes the largest number of the inmates of our blind asylums.

Such being the case, it is necessary that the physician who

attends mother and child, should be alert to discover the condition of the infant's eyes, and also to avoid it, if possible, by proper care of the mother before parturition.

PROPHYLAXIS.—It is important and necessary to exercise the most rigid care to prevent infection of the eyes of the infant, by careful disinfection of the vagina before and during parturition in all cases where a specific or acrid leucorrhoea, whether cervical or vaginal, exists in the mother.

When the mother presents an acrid leucorrhoeal or gonorrhoeal discharge, or a vaginal discharge of whatever character, the most scrupulous attention should be given to its correction prior to confinement. The use of cleansing lotions of large quantities of warm water, containing carbolic acid, boracic acid, sulphate of zinc, or glycerole of tannin, for several days prior to confinement will undoubtedly lessen the danger of infection. After the birth of the child, and before the cord is severed, the physician should at once cleanse the eyelids with bits of soft linen, or absorbent cotton ; remove all secretion from the cilia, and wash the eyelids and surrounding parts in a saturated solution of boracic acid.

When we have reason to suspect that danger of inoculation is probable, we should, as soon as the child has been otherwise cared for, evert the lids to discover and remove any of the unctuous material mixed with leucorrhoeal discharge which may have insinuated itself beneath the lid, and found a resting-place upon the folds of the conjunctiva.

Symptoms and Diagnosis.—The most typical cases of ophthalmia neonatorum occur from twelve to seventy hours after birth. Usually before the third day we find the eyelids somewhat reddened, slightly swollen, and a slight flow of tears. Eversion of the lids will show bright red transverse lines occupying the middle of the palpebral conjunctiva ; shortly after this, the edges and angles of the lids become red, and perhaps painful on pressure. The ocular conjunctiva is next to become involved ; it appears bright red, and the swelling of the lids increases. The discharge which at first was almost entirely of tears, now becomes serous, and gradually assumes the appearance of turbid whey. There is considerable photophobia, which causes the infant to close the lids tightly, so that some difficulty is experienced in opening them. This closes the first stage. The second stage, or that of suppuration, is ushered in usually by a marked increase in the swelling of the lids. This swelling increases so rapidly that often in twenty-four hours they cannot be separated without considerable force. The upper lid usually overlaps the lower one, and, in most cases, is

so stiff that it is difficult or impossible to turn it. On separating the lids the exposed conjunctiva is thickened, perhaps raised in folds, and of a diffused bright red hue through which the sclera can be dimly seen. At first there is a muco-purulent coating over the entire conjunctival surface; the discharge soon becomes more abundant and decidedly purulent, and later is thick and creamy. The effusion into the conjunctiva is generally serous and causes chemosis or swelling of the conjunctiva of the eyeball and protrusion of the lids, but in some cases contains much fibrin, and the conjunctiva presents a raised and resisting surface in that portion; this condition arises more particularly in the course of gonorrhoeal infection, and is, of necessity, very grave, owing to the danger to the cornea from the compression of the vessels which supply it. When the effusion is very great, the swelling of the ocular portion may extrude between the lids, and the palpebral swelling causes eversion of the lids, the latter giving rise to a spasmodic action of the orbicularis, or blepharospasm, which, by increasing the pressure upon the eyeball, causes increased danger to the cornea.

As the inflammation increases the secretion of pus becomes enormous, considering the small area of the suppurating surface. The free edges of the lids are stuck together by the discharge drying upon them, and their separation causes the discharge to gush out with some force, and oftentimes with danger to the operator. The cornea is thus kept macerating in the imprisoned pus. The cutaneous surface of the lids is livid, traversed by enlarged veins from the passive congestion. Early in the second stage it is usual to notice unmistakable signs of pain. There may be some marked febrile reaction, the child becomes restless and refuses the breast. If the local affection is slight, the child usually thrives. In the majority of cases of ophthalmia there is no further advance of the disease; the inflammation having reached its height now begins to subside, and usually results in complete recovery, without sequelae. Some cases, however, pass into a chronic catarrhal inflammatory condition, and in others the papillae become hypertrophied or true granulations result. If the cases do not end here, irreparable damage results from the third stage which is entered upon, in which we have involvement of the cornea in the inflammation. This complication is more frequently the result of gonorrhoeal infection or of badly treated or neglected cases.

The cornea may exhibit the effect of the destructive process at small points or over its whole surface. The corneal affection usually appears in from eight to ten days after the disease has become established. The corneal epithelium is lost from con-

stant maceration in the pus, and the cornea presents at first a hazy or milky appearance, which soon becomes yellowish and finally ends in complete suppuration, rupture of the cornea and, perhaps, loss of the lens, extrusion of the iris and atrophy of the bulb. If the disease is arrested before suppuration of the cornea is complete the eye recovers with a nebulous cornea, presenting much the appearance of ground glass; this condition may clear up very much owing to the activity of the absorbents in infancy, a result which may be hastened by the assistance of certain homeopathic remedies.

In another class of cases we may have one or more minute grayish points of corneal infiltration and softening which give rise to ulceration and perforation. In others still, the whole cornea may slough, as the result of the strangulation of the vessels by the chemotic swelling, so that on the second or third day the eye is entirely destroyed. In the milder cases of strangulation of the blood-vessels of the cornea which nourish it, there may be one or more rapidly spreading central or marginal ulcers, which appear as if portions of the cornea had been chipped out, with clean cut edges and transparent bases which are difficult to detect unless viewed by oblique illumination. These are more difficult to heal than the others; the edges become rounded, blood-vessels develop in them and they rapidly fill up.

As a rule, both eyes are affected simultaneously, or in rapid succession; at times, one eye is infected and the other remains free. In all cases the eye should be carefully examined by the medical attendant, and to do this, the discharge should be carefully removed from the lid margins and lashes, and then the eyelids separated by the fingers applied above and below, or if necessary, small retractors should be used; having in this manner obtained a view of the whole anterior portion of the eyeball, the cornea should be thoroughly examined. The duration of the disease is from three to six weeks, and much longer if improperly treated, or neglected.

Treatment.—The eyes should be shaded from the light, but it is not necessary to confine the infant to a darkened room; rather place it in a light and well-ventilated apartment. The success of the treatment depends upon the frequent removal of the discharges, the eyes being constantly cleansed with scraps of old linen or bits of absorbent cotton, and the further cleansing of the eyes with solutions of chlorine water diluted one-half, boracic acid (gr. x. ad ℥i.), or arg. nit. (gr. i. ad ℥i.) injected into the eye from an eye-dropper, and the use of vaseline to the lid edges will be sufficient to carry the majority of cases to a favorable termination without other remedies. The use of cold

compresses is not applicable to such young infants, but in case corneal affections appear, frequent bathing of the eyes with warm water every five minutes during the day, and every quarter-hour at night, and the use of a solution of atropine (gr. ⅛ ad ℥i.), one drop every three hours, will be indicated. The careful following of the directions for the removal of the discharge and the administration of arg. nit., 6th to 30th, puls., merc. or hepar sulph., will be sufficient to bring the cases to a favorable termination. Other remedies may be useful and their indications will be found under Conjunctivitis Purulenta.

CATARRHAL CONJUNCTIVITIS of the new-born infant often presents itself within the first weeks of its new life. The secretion of the inflamed conjunctiva is often muco-purulent, instead of being mucoid; the lessened intensity of the symptoms enables us to differentiate this affection from that just described.

Etiology.—The inflammation seems to arise from exposure to varying temperature, to want of proper protection during the bath, the want of proper hygienic surroundings, carelessness upon the part of the nurse in cleansing the eyes or the transferrence of foreign matter to the eyes from the fingers or cloths used by the attendant. Undoubtedly the exposure of the eyes of the infant to strong and bright lights, occasions in some cases the inflammatory reaction.

Symptoms.—There is usually some swelling of the lids, the eyeballs present a more or less bloodshot appearance. There is also anxiety and restlessness of the child due to the discomfort of the eyes, which interferes with its sleep.

The discharge, at first watery, becomes mucoid, collects upon the lids and eyelashes and causes their adherence.

The discharge never presents that yellowish color, creamy consistence nor quantity that is found in the purulent conjunctivitis.

Prognosis.—As the symptoms are more mild than in the purulent form, the danger to vision is slight, as the cornea is seldom affected, and the disease is capable of spontaneous cure in the majority of cases, within a week or two of its inception. The greatest danger is from a possible chronicity, which may occasion the development of true trachoma or granular lids later, as is commonly the case in ophthalmia neonatorum.

Treatment.—The use of some mild collyria, such as the borax, boracic, alum or tannic acid glycerine, together with the internal use of aconite, euphrasia, hydrastis, sulphur, mercu-

rius, or argent nit., are sufficient to hasten the cure and lessen the danger of any chronic condition resulting.

PHLYCTENULAR OR PUSTULAR CONJUNCTIVITIS is a recurrent form of inflammation, characterized by the appearance of one or more vesicles or papules upon the ocular conjunctiva, supposedly around the terminal filaments of the branches of the fifth nerve, and often occurring near the cornea. Each papule or phlyctenule forms a small patch of localized congestion towards which converge a leash of vessels which can frequently be traced back to the folds of the conjunctiva. These phlyctenules may present a semi-transparent or yellowish elevation or be more flat, large, and give the appearance of a gelatinous infiltration at that point. There may be one or many scattered over the ocular conjunctiva, or aggregated at the corneal margin, or they may encircle it and appear upon the cornea also. In a few days the vesicle which forms the summit of the phlyctenule, ruptures and leaves a shallow ulcer with a yellowish base which heals in a few days. In some cases small points of congestion only, appear and after a short time subside without the formation of a vesicle. The pain is usually not severe, the photophobia or dread of light variable, and in some cases very slight, in others, intense and accompanied by severe blepharospasm. The secretion is commonly scant and mucoid in character.

The disease shows a great tendency to recur and the phlyctenules appear in successive crops after the lapse of weeks or months. They are very prone to appear in the winter and spring. Children have a peculiar liability to the disease, as it is only rarely seen in adults, and may be considered as indicative of some derangement of the general health. It is common to delicate and ill-nourished children, particularly those who live upon an almost exclusively starch diet, or use tea and coffee.

Treatment.—The treatment consists in the improvement of the general tone of the patient, and the restriction of such nerve stimulants as tea and coffee. The patient should be urged to live upon a mixed diet, as many cases cannot be cured until a moderate amount of nitrogenous food enters into the daily nourishment. External applications are rarely necessary, as the cure is much more rapid and permanent by the use of internal remedies than with topical applications. Of the latter, those which are generally recommended are the yellow ointment, a small bit of which is introduced between the lids and allowed to melt upon the conjunctiva, calomel or flowers of sulphur dusted upon the phlyctenule, or solutions of merc. nit. dropped into the eye.

REMEDIES.

Sulphur.—Very frequently indicated in cases occurring in scrofulous children. Its sphere of action is very wide and suits a great variety of cases of pustulous inflammation of the conjunctiva, and is particularly indicated when there are sharp, darting, lancinating pains, or as if pins and needles were sticking in the eye during the day, or if the pains aggravate after midnight. There may also be itching, often a thickened condition of the lid and much rubbing of the eyes. The photophobia is variable and may be quite marked in the morning. The lachrymation is usually profuse and the lids generally stick together on awakening.

There is often an eczematous condition of the lids, face and head, and general aggravation from the application of cold water, or from bathing the eyes.

Pulsatilla.—The phlyctenules are more frequently of the small variety, but often numerous; the photophobia or pain is commonly slight and the redness variable. The lachrymation and discharge are moderate and bland, although it is not contra-indicated if the secretions are profuse. Particularly suitable to the blonde women and children upon whom pulsatilla seems to have so good an action.

Mercurius Sol.—A valuable remedy in many cases of phlyctenular inflammation in strumous or syphilitic children. There is usually marked redness of the conjunctiva, and violent photophobia, so that all light must be excluded, and the discharge usually thin and acrid. The pains are severe and neuralgic in character, affecting the temporal side of the head and face. They are variously described as burning, sharp, tearing, and lancinating, and aggravated in the evening and from the exposure of the eyes to artificial light, by heat and damp weather, while there is a temporary relief from application of cold water to the eyes. The lids are often thick and swollen and spasmodically closed and excoriated by the discharge.

Merc. Cor.—Indicated in the aggravated form of inflammation occurring in scrofulous children. The symptoms are much more marked than in the other preparations of mercury, the pains, photophobia, lachrymation, all being aggravated; the nostrils are often excoriated by the acrid discharge from the eye, passing down into the nose.

Mercurius Dulcis.—Although calomel is used very extensively by the old school in scrofulous ophthalmia, it is but rarely applicable to phlyctenular inflammation; some cases, occurring in pale, flabby subjects, with excoriation of the nose, and swelling of the upper lip, have been benefited.

Mercurius Nit.—This remedy, recommended by Dr. Liebold, was used by him with remarkable success in a great variety of cases of phlyctenular inflammation. It seems to suit severe as well as mild affections, acute or chronic, with or without much photophobia, and in some cases presenting severe pain, in others where the pain is absent. It may be used both internally and externally. If externally, ten grains of the first decimal trituration are to be dissolved in two drachms of water and applied by means of a camel's hair brush to the phlyctenule two or three times a day.

Graphites.—This is one of the most valuable remedies we have for all forms of phlyctenular inflammation. It is useful in both the acute and chronic forms, particularly in cases where there is a marked tendency toward recurrence. It is specially indicated in scrofulous cases, or with exanthematous eruptions about the head or behind the ears, particularly where the eruptions are glutinous, fissured and bleed easily. The photophobia is usually very marked, and the lachrymation profuse, although in some cases nearly or entirely absent. There is generally a greater aggravation from sunlight than from gaslight, and in the morning, so that often the child cannot open the eyes before nine or ten o'clock. The conjunctiva is frequently very red, and the discharges are muco-purulent, constant, thin and excoriating. The pains are variable and not characteristic, the lids are sore, red and agglutinated in the morning, or else covered with dry crusts, while the external canthi are fissured and bleed easily upon opening the eye. There may be also an acrid discharge from the nose accompanying the eye affection.

Calc. Carb.—Phlyctenules occurring in fat, unhealthy children, with pale, flabby skin and enlarged glands. The photophobia is often excessive, and the lachrymation very great and often acrid. The redness and pains (sticking in character) are variable and the lids perhaps swollen and glued together in the morning.

Calc. Sulph.—Will prove exceedingly valuable in many cases when the general symptoms of calcarea are present with enlargement of the cervical glands. The lower attenuations should be used.

Hepar Sulph.—Is adapted to phlyctenular inflammation occurring after measles, or in strumous children, where there is intense photophobia, lachrymation, an injection of the conjunctiva with swelling of the lids, sensitiveness to touch and a desire to have them covered, and when the external canthi bleed easily on opening them.

Arsenicum.—Cases occurring in thin, ill-nourished children,

without marked inflammatory symptoms. There is usually intense photophobia, and profuse, acrid lachrymation. The phlyctenules tend to form ulcers which extend superficially and take on an indolent character.

Rhus Tox.—Where there is excessive photophobia, lachrymation and spasmodic closure of the lids. There is generally a vesicular or pustular eruption upon the eyelids or face. Antim. tart., ipec., kali.bi., mez., crot. tig., euphrasia, sepia, and baryta, are also serviceable in phlyctenular conjunctivitis and will give prompt results when indicated.

Ulcers of the Cornea are of frequent occurrence among children, but less so among infants. The most simple form of ulceration of the cornea is that exhibited by a grayish-white spot which is usually located at the center of the cornea. It is often not examined early enough to show its flattened conical elevation presented in the first stage, the later development exhibiting a slight depression of the cornea with perhaps little of the grayish infiltration which marked its beginning.

The photophobia, congestion of the eye and swelling of the lids, are variable symptoms which also seem to bear by their intensity no ratio to the duration or extent of the ulcer.

As these ulcers commonly attack the central portion of the cornea, their danger to vision is great, as they usually attack one eye at a time, and tend to recur in the same or the other eye. The opacity or scar thus left is greater in those cases where the repeated ulceration has caused the greater loss of transparency. The central location of the opacity causes such a marked interference with the function of vision in many cases as to destroy the sight entirely. In cases where the ulceration is acute in its course and heals rapidly, the destruction of tissue and loss of transparency is much less than in those which present a chronic and recurrent character. In some cases the repair of the lost substance is not completed and a flattening of the curve of the cornea occurs at the site of ulceration which interferes greatly with the vision.

It should be borne in mind that these ulcers now and then tend to spread, and take on a suppurative character, when this occurs the danger becomes very great. The original infiltration sometimes passes rapidly to the formation of an abscess of the cornea, with extensive destruction of tissue and loss of the eye. When an abscess is forming, a small spot slightly raised appears, accompanied by much pain and congestion. It enlarges rapidly, becomes yellow in color and commonly ruptures outward, leaving a more or less deep, round ulceration with a yellowish, purulent infiltration, which may ultimately

destroy the cornea. Sometimes the abscess may open into the anterior chamber, and hypopyon, a collection of pus in this part of the eye, results.

The causes which give rise to these destructive attacks are, in my opinion, invariably those due to malnutrition, defective nourishment, and a strumous habit, with bad hygienic surroundings.

PHLYCTENULAR ULCERS (phlyctenular keratitis, pustular ophthalmia, marginal keratitis, strumous or scrofulous ophthalmia) constitute the larger number of ulcerations of the cornea occurring during childhood.

The causes which give rise to them are the same as those which have already been indicated as producing the central ulcerations.

The symptoms are first, photophobia, that one which is usually most marked and which is common to all corneal inflammations or ulcerations. The dread of the light varies with the development of the phlyctenule or pustule upon the cornea, being often slight in the first stage and moderate later, or intense to a degree that there is no place sufficiently dark to enable the child to open its eyes.

This over-sensitiveness to light causes, as a reflex, a marked spasmodic closing of the lids. The blepharospasm is often one of the most painful and most annoying of the symptoms which occur in this disease. The child is inclined to lie with its face buried in the pillow, or the lap of the mother, or seek the darkest corner of the room and cover the eyes with the hands.

A pustular eruption is often present on the face and lids. The constant discharge of mucus from the nose, owing to the irritating qualities of the secretion from the eyes which passes into the nose, gives rise to the common idea that the child is suffering from a cold in the head.

If the lids are separated, and it often requires considerable force upon the part of the examiner to do so (unless he has instilled a drop of a 2-per-cent. solution of cocaine at intervals of two or three minutes for two or three times), we find perhaps only a single spot upon the cornea with a triangular-shaped injection of blood-vessels radiating from it. There may, however, be several of these phlyctenules situated upon different portions of the cornea or arranged in ring-shape at the margin of the cornea, often encircling its whole periphery. These pustules vary in size from a small point to those of two or three millimeters in diameter. They are due to exudation of serum beneath the epithelial layers of the cornea and usually about the terminal filaments of the branches of the fifth

nerve which supply it. The phlyctenule, bleb or pustule thus formed by the exudation is raised above the surface of the cornea, and contains within its cavity serum, a few leucocytes, or some white corpuscles. Its top may appear yellow, but more often when seen the surface is abraded and it has a grayish and aphthous look. The eruption may be resolved without breaking down in some cases, but the majority rupture and ulcers result. The rupture is followed by rapid healing in some cases. More frequently, however, the ulcer takes on a sluggish condition and becomes a source of much discomfort to the child and danger to its vision.

The congestion of the eyeball and cornea as well as the pain vary extremely in degree in different cases, the congestion being usually confined to that part of the sclera immediately surrounding the cornea, but may involve the whole of the sclera as well.

The pain is usually referred to the parts about the eye in those cases when the child is old enough to describe it, or involves the whole head when there is great photophobia and the eyes are exposed to the light.

Treatment should consist, first, in the attempt to correct the nutrition by regulation of diet, the increase of the nourishment by the addition of those condensed foods which are now so well prepared and which are usually readily digested and assimilated. My preference in those cases has been for those that are made from beef. Murdock's Food, Bovinine and certain of the beef extracts are of the greatest value in supplying to the blood those elements which are so necessary for the protection of the cornea, which derives its nourishment only indirectly from the blood-vessels, so that if the blood is not in a well-nourished state, by the time it reaches, in its diluted condition, the central portion of the cornea, there is not enough nourishment in it to maintain the vitality of the part and the ulceration and destruction begin.

Second, in the effort to accomplish an early repair of the ulceration by such local applications and measures as may be deemed expedient. Among the possible aids in this direction may be mentioned the probable necessity of keeping the eye quiet by bandaging in the effort to hasten the healing process. As a rule, I do not advise the bandaging of the eyes of very young children except in special cases, as its good results depend much upon the judgment and experience of the medical attendant in these cases. In childhood and youth the bandage is likely to do more good and less harm than in infancy. The objection to close bandaging is due to the confinement of the secretions, often acrid, within the eye, which thus increases

rather than diminishes the inflammatory process and the inability of the attendant to properly readjust the bandage when its removal may be so often necessary for the purpose of instilling the collyrium (boracic acid grs. viii. to *f*℥i.) which is intended to lessen the irritation arising from the increased or changed secretion, or the application of lotions (chlorine water diluted one half, saturated solution of boracic acid, or bi-chloride sol. 1 to 10m), intended to act as germicides and thus lessen the danger of further infective extension of the ulcerative process.

Third, to stimulate the healing of the ulcers, especially in those indolent cases which cause all so much anxiety, by such applications as calomel, finely divided flowers of sulphur, which are gently dusted upon the ulceration, or the use of a minute portion of an ointment made of cosmoline, ʒ i ad grs. ii. hydrg-ox-flav., which is introduced between the lids and rubbed upon the eyeball.

Fourth, to relieve the photophobia by the use of smoke-tinted goggles or in less severe cases the visor-eye-shade may enable the child to get that stimulus from light, fresh air and exercise that it most needs and without detriment to its eyes. The pain should be relieved as far as may be possible by the occasional use of atropine solution (⅛ gr. to 2 gr. to the *f*℥i.), when the ciliary congestion is marked, or much relief may be obtained from hydro-chlorate of cocaine (2 per cent. sol. a drop once or twice a day).

Fifth, benefit sometimes follows the application of hot fomentations or poultices; the latter, however, should never be applied except when directed by the ophthalmic surgeon, as their use is more likely to do harm than good; poultices being usually indicated only in those cases where the cornea presents an abscess of consideratable extent, a suppurative ulceration, causing rapid destruction or a necrotic condition is imminent. In some cases it may be necessary to apply the electric cautery in the effort to limit the destructive process. In all cases where the physician is in doubt about the necessity for, or the value of topical applications which in his judgment might be detrimental, it is better to await for a day or two the result of the internal medicines which he has prescribed, as in some of these severe cases, it is impossible for those who are skilled by judgment and experience to advise with certainty those local measures which may be best in certain cases.

The internal medications necessary for the cure of these ulcerations of the cornea of children, have a more reaching effect than the local measures mentioned and are more rapid in their action in controlling and limiting their destructive influences.

REMEDIES.

Aconite.—Superficial ulcers arising from injuries. It may be used both internally and externally.

Arsenicum.—Corneal ulcers occurring in weak, anaemic children. They are often superficial and have a tendency to recur. The photophobia is excessive and the lachrymation acrid and burning. The pains are more frequently burning and aggravated after midnight. Small grayish central ulcers which occur in young children and tend to perforate.

Aurum.—Vascular ulceration of the cornea and ulcerations occurring during the course of pannus, or as the result of abscess. There is much photophobia, profuse scalding lachrymation and sensitiveness of the eye to touch, and pains apparently extending from the parts around the eye to the eye, and aggravated by touch.

Calc. Carb. and Calc. Hypophos.—Ulcerations occurring in ill-nourished patients which show a tendency to slough, or which result from abscess.

Conium.—Some superficial ulcers without much pain or redness, but with intense photophobia.

Graphites.—In some cases of ulceration of the cornea which have followed attacks of phlyctenular inflammation of the cornea or conjunctiva.

Hepar Sulphur.—A valuable remedy for all ulcers or abscesses where there is pus in the anterior chamber. There is usually a marked sloughing tendency and the pain is throbbing and the photophobia intense, while the conjunctiva is often red and thickened or chemosed. There is relief generally from bandaging the eye and the application of warm compresses, although there is great sensitiveness of the eye to touch.

Ignatia.—Small chipping ulcers without much discomfort, which occur in connection with derangements of the digestion; also small pinhole ulcers, which are attended by photophobia and sensation as if something was in the eye, in nervous and hysterical patients.

Mercurius.—Often indicated in both superficial and deep ulcerations. There is generally grayish infiltration of the base and around the ulcer, which is also often vascular. The discharges from the eye are profuse, thin and excoriating. There is a general aggravation at night. Concomitant symptoms more frequently decide upon the particular form of mercury to be administered; the eye symptoms indicating merc. cor. being more intense and there is much ciliary injection and pain.

Merc. Nit.—More useful in those ulcerations which partake of a phlyctenular character.

Merc. Prot.—Ulcerations occurring with pannus; its efficacy in ulcus serpens is very doubtful and it has not proved as useful as calc. phos. or silicia in these cases.

Nux Vomica and Pulsatilla suit some cases of superficial ulcerations with intense photophobia, and it becomes very difficult to differentiate between them when marked concomitant symptoms are not present.

Silicia.—Indicated in some cases of sloughing ulcers of the cornea, as in the marginal ulcer, and when small, funnel-shaped non-vascular ulcers appear near the center of the cornea and rapidly perforate.

Sulphur.—When the ulceration is indolent and tends to slough this remedy will be useful. There is often considerable infiltration around the ulcer, but no vascularity. The photophobia, lachrymation and other symptoms are variable. The sharp, sticking pains, which are commonly present and worse after midnight, are very characteristic. The subjects are strumous and the general condition is indicative of sulphur. Many other remedies may have to be consulted for individual cases.

DIFFUSE KERATITIS (syphilitic, interstitial, parenchymatous, strumous or scrofulous keratitis), is an inflammation of the cornea which essentially is a disease of childhood. It occurs commonly between the ages of five and twelve, some cases being reported between the second and third year, and very rarely later than the fifteenth year, and still much more rare in adult life.

Etiology.—Inherited syphilis is the undoubted cause of this disease, and in children in which it presents itself we have the physiognomy, notched teeth, skin, mouth and bones which we have learned to regard as positive indications of syphilitic inheritance. In the absence of these signs, we may have to assign as the cause a scrofulous or strumous habit; or with other symptoms it may be coincident with the secondary stage of acquired syphilis, the latter, however, being extremely rare.

Symptoms.—A grayish opacity first shows itself at the center of the cornea in the tissue, and gradually extends with increasing density, until the whole cornea has lost its transparency. Again, the opacity may begin at one or more places near the margin of the cornea and extend to the center. These changes in the cornea which mark the beginning of a chronic inflammation of its tissue, and which does not go on to ulceration or abscess, are ushered in by a preliminary stage, often overlooked. of injection of the sclera about the margin of the cornea, and a watery appearance of the eye from increased lachrymation. The sight is rapidly lost, and if the disease attacks both cor-

neas, as may be the case, though usually the disease is well advanced in one before the other is affected, the first symptom noticed in young children is the falls the child suffers from, owing to its imperfect vision.

It is rare that more than a few months intervenes before the second eye is attacked, and extremely rare that a year or more elapses, as the disease is commonly symmetrical.

In from two to four weeks the cornea becomes so opaque that the iris and pupil are no longer seen, and the grayish-white appearance looks like ground or frosted glass, its surface roughened from the loss of portions of its epithelium. An inflammation of the iris often complicates the attack, and by adherence to the lens capsule (posterior synechia), lessens the recovery of vision, as well as increasing the discomfort of the sufferer. The pain, if the iris does not become involved, is not marked, and the dread of light is perhaps less marked in this, than any other disease of the cornea.

The opacity, on close examination, is found in many cases to be of unequal density, or may present a reddish color due to the development of blood-vessels in the layers of the cornea. This vascularity may involve the whole or only portions of the cornea, and may be regarded as an indication of a more serious attack than when absent.

Prognosis.—The duration of the attack is prolonged from six months to two years, and when the diagnosis is made, the parents of the child should be informed of the probable time to be consumed in the development of the various stages, and that the ultimate recovery is reasonably sure. While the prognosis as regards the vision is good, the cornea rarely recovers its perfect transparency. Relapses are not infrequent, and complications of the iris, choroid, retina and glaucoma may occur, rendering the prognosis more grave.

Treatment.—Homeopathic remedies have the power, when properly used, to lessen not only the severity of the attack and mitigate its symptoms, but also to shorten its duration in a remarkable manner.

No local applications, except that of atropine in cases of iritic complications, or the occasional use of cocaine for temporary anesthetic purposes, are advisable, as indeed all others are harmful. In rare cases hot compresses may be of value, but should only be applied under skillful direction.

As these patients are often anaemic or present indications of impaired nutrition, particular attention must be given to proper feeding or necessary stimulation.

The indications for the remedies should be carefully studied; these given here constitute the ones more frequently needed.

REMEDIES.

Aurum Mur.—This preparation is one of the most frequently indicated in cases of syphilitic keratitis. The symptoms are those of diffuse infiltration with moderate photophobia, and pain which is of a dull character and referred to the parts about the eye.

Mercurius Sol.—The inflammation is more active; there is usually more pain, greater ciliary injection and nocturnal aggravation than under aurum, and the general concomitants of mercury are present.

Mercurius Prot.—Often useful when merc. sol. does not act promptly.

Arsenicum.—Diffuse keratitis with marginal vascularity. The photophobia is intense, the lachrymation profuse, and burning pains are complained of. The aggravation after midnight, restlessness and thirst are commonly present.

Apis Mel.—With the infiltration of the cornea there is moderate injection of the ciliary region and photophobia. Febrile disturbance, thirst, and drowsiness often accompany the condition.

Hepar Sulphur.—Often serviceable when there is much ciliary injection or pain, great photophobia, lachrymation and sensitiveness of the eye to the touch.

Baryta Iod.—When enlargement of the cervical glands, which are hard and painful on pressure, accompany the diseases of the cornea.

Kali Mur.—Interstitial keratitis with occasional pain, moderate photophobia and redness.

OPACITIES OF THE CORNEA, resulting from the various inflammatory affections of the cornea, are termed leucoma, macula, and nebula according to the density of the scar, the former being the most dense. When their location is not central the vision may not be affected, but when located over the pupil the vision is destroyed in proportion to the thickness of the opacity.

In children the prospect of gradual absorption is good, but it is rare that the vision becomes as good as it was before the affection, which caused its appearance, occurred. The lessening of the opacity as the child grows older lessens the cosmetic defect of the eye, even if the vision is not impaired. When these opacities are central and occur in both eyes, they give rise to nystagmus, that oscillating, restless movement of the eyes which occurs when, owing to the impairment of its central vision, the child endeavors to fix the eyes upon the object so that a better image may be obtained through the more transparent

portions of the cornea. In cases where it is bilateral, divergent squint occurs, or when unilateral it may be a cause of convergent squint.

The treatment consists of the use of such homeopathic remedies as hepar sulph., calc. carb., silicea and sulphur, which in some cases exhibit a marked influence in occasioning rapidity of tissue change after inflammatory processes. In addition certain drugs, which, when applied to the scar, occasion a temporary congestion or mild inflammation and hasten its clearing, merc. nit., boracic acid powder, sulphate of soda or resorcin, when applied by means of a small swab of cotton, giving the best results.

When both eyes present a central opacity, or the vision only resides in the one affected by the scar, a new pupil should be formed by making an iridectomy in the direction of the most transparent portion of the cornea remaining.

When in older children or adults the leucoma is a source of great disfigurement, it may be tattooed with india ink.

STAPHYLOMA of the cornea, a bulging projection of the cornea which occurs frequently in children, results from either perforation of the cornea and prolapse of the iris following ulceration in purulent forms of conjunctivitis, or from the softening of the corneal tissue which accompanies some cases of chronic phlyctenular inflammations with increased fluid pressure within the eye.

If the bulging involves the whole of the cornea, it is apt to continue until it becomes a serious deformity and protrudes between the lids, notwithstanding our efforts to lessen the tension by frequent tappings of the anterior chamber (paracentesis corneae), or the removal of a portion of the iris (iridectomy). When it is complete, and subjected to irritation, inflammation of the ball occurs and it becomes necessary to remove the projecting portion (abscission) or remove the eyeball (enucleation).

BLEPHARITIS MARGINALIS (ophthalmia tarsi, tinea tarsi, acne ciliaris, blepharo adenitis), the free margins of the eyelids containing the meibomian glands, the cilia, sebaceous and modified perspiratory glands are liable to acute and chronic inflammation in infancy and childhood. With the terminal circulation of the blood supply at their borders, the high development of glandular structure within them and transition from skin to mucous membrane which occurs at their movable edges, are presented anatomical conditions which may readily acquire a pathological state by inflammatory changes due to heredity,

impoverished blood, external irritation, or reflex eye strain due to errors of refraction.

Various types of the disease may be described and the disease may affect both lids of the eyes, or only a single lid or part of it.

In the more simple cases an incrustation about the base of the cilia, resulting in a pyramidical or conical formation from an increased secretion from the sebaceous glands at the roots of the eyelashes presents the condition which is distinguished often by the laity as "granular lids," a misnomer always.

Some cases may present only a superficial eczema, characterized by slight redness, with dry or moist scales which form upon the lid-edges, but do not form masses clinging to the eyelashes, as in the former type. These types may soon lose the simplicity by the lid-border becoming red, the glands and eyelash follicles inflaming and the lid-margin thickening, yellow points due to purulent infiltration present themselves, ulceration more or less deep of the lid-margins follows. The chronic process set up in the appendages of the eye, results in the loss of the cilia, the destruction of the lid-margins or their deformity. The cosmetic defect produced by the ravages of this disease is perhaps more readily noticed than that of diseases of the eyeball which destroy its beauty or the function of sight.

Etiology.—This affection of the eyelids begins often early in childhood and infancy, and is due either to heredity, malnutrition, or follows as a sequela of the eruptive fevers, of the latter, measles perhaps furnishing more commonly the exciting cause. Chronic catarrhal affections of the conjunctiva and lachrymal sac both cause and complicate this disease. Bad hygienic surroundings, the exposure to wind, dust, impure atmosphere, as in crowded tenements, should also be mentioned as exciting causes.

Treatment.—In both the simple and severe cases the local treatment demands the removal of the masses which form upon the cilia, which while they remain, tend to increase by their irritation the inflammation of the lids. This is not so readily done as might be supposed, as the crusts thus formed are hard, not readily soluble, and their mechanical removal often painful, and particularly so when the eyelashes are removed with them.

For the removal of these masses the lids should be bathed in warm water in which a little bicarbonate of soda or borax has been dissolved, and as soon as the crusts have been moistened they are removed by drawing the cilia through the thumb and forefinger, or picked from the lashes by the aid of a pair of forceps. These crusts once thoroughly removed, the free mar-

gins of the lids should be smeared with vaseline or cosmoline in their plain forms, or in combination with mercury or graphites in the form of an ointment. The use of these preparations hastens the recovery by lessening the irritation of the inflamed lid, and by their specific remedial effect when thus applied. The effort should be made to have the accumulations upon the lid-edges removed as rapidly as they form to prevent the increased irritation caused by their presence.

When blepharitis does not respond promptly to treatment, the refraction of the eye must be examined, and when found affected, glasses which properly correct the ametropia must be worn constantly.

Occasionally the presence of lice (*Phthiriasis ciliarum*) upon the lashes simulates blepharitis or causes it. The lice are to be picked off, the nit which clings to the cilia destroyed, and the lid-margins anointed with mercurial ointment to prevent their redevelopment.

REMEDIES.

Aconite.—Indicated in an acute attack, but such cases are extremely rare, and when occurring, result from exposure of the eyes to dry cold winds during long drives. The lid-margins are swollen, hot and dry, and there is more or less inflammation of the conjunctiva accompanying it.

Graphites.—The action upon the edges of the lid is very marked, and is perhaps the most useful remedy we possess for the chronic form of blepharitis, particularly when occurring in strumous subjects and accompanied by the moist, fissured and easily bleeding, eczematous eruptions on the cheeks or behind the ears, which are so promptly cured by this remedy. The swelling of the margins of the lids is variable, in color pale red, and crusted with dry scabs which cover spots of ulceration, or numerous fine scales are found on the skin and among the cilia, which can be brushed off. There is much itching, burning and biting of the lids which the patient tries to relieve by rubbing, but this only aggravates the trouble. In many cases there is a fissured condition of the skin of the outer canthus, which bleeds readily from rubbing or opening the eyelids. The cure is hastened by the application of the graphites ointment to the lids at night.

Mercurius.—The various forms of mercury are extremely useful in blepharitis, the merc. sol. or vivus more frequently perhaps than the others. The lids are much thickened, red, and often ulcerated, with sensitiveness to touch, heat and cold. The lid conjunctiva is hyperemic, or inflamed, with an acrid lachrymation which increases the irritation of the lids. There

is an aggravation of the whole condition from exposure to the light and heat of fires, or in the evening from artificial light. The local application of an ointment containing grs. ii of the merc. precip. alb. or the merc. iod. flav. to ℥i of vaseline will be found very useful.

Merc. cor. and prot. present similar symptoms, but in a more marked degree and where there is a pustular eruption on the parts about the eye or upon the conjunctiva. The prescription must be based upon a careful consideration of the circumstances and symptoms as well.

Sulphur.—Suitable in a large number of cases occurring in scrofulous children where the disease is occasioned by the debility following the exanthematous diseases, or appears as the accompaniment of eczema of the face or head, for which sulphur would be indicated. The lids are red, swollen, with numerous small points of suppuration, or are ulcerated along the edges. The characteristic pains are fine, sharp and sticking, though itching, biting, burning and many other sensations may be present. There is usually an aggravation from wet applications to the parts as well as a general aversion to being washed.

Pulsatilla.—In cases arising from some gastric derangement dependent upon consumption of fat foods, there is a great tendency to the formation of styes, and frequently acne of the face. The swelling and redness of the lids may vary, though there is usually a rather profuse, bland discharge which agglutinates the lids during the night. Itching and burning are complained of, with a general evening aggravation and from a close or warm atmosphere, with relief from fresh cold air.

Arsenicum.—Blepharitis occurring in cases where the general condition presents debility, restlessness, thirst, night aggravation, etc. The lids are often puffed and their edges very red, and excoriated by the acrid lachrymation which is a frequent accompaniment of the condition; again the lids may be smooth, red, and shed numerous scales. The pains are burning in character.

Calc. Carb.—Especially adapted to blepharitis in fat, unhealthy children who sweat much about the head. The lids are swollen, edematous and red, with a thick, excoriating, purulent discharge, accompanied by great itching and burning of the lid-margins, particularly at the canthi, with aggravation from damp weather and in the morning.

Calc. Phos. and Iod. are serviceable in strumous cases presenting enlargement of the tonsils and cervical glands, with the eye symptoms of the carbonate.

Hepar Sulph.—The lid-margins are studded with small ulcers which destroy the lid tissue; or they are thick, inflamed and

tender to touch, with small furunculous swellings along the margins or in the meibomian glands; eczematous condition of the face or outer canthus of the lid with cracking and bleeding on opening the eyes. (Compare graphites.)

Petroleum.—Indicated in affections of the lid when there is itching and dryness, with smarting and sticking pains in inner canthus. The skin of the lid is often rough and dry, and frequently accompanied by the occipital headache characteristic of petroleum. The external application of vaseline or cosmoline softens the skin and prevents the rapid formation of the crusts and the gluing together of the lids, and thus by giving relief from this annoyance exerts a beneficial influence.

Antim Crud.—Curative in cases occurring in children where graphites seems indicated, but when administered gives no result. The lids are inflamed, swollen, moist, and there is a pustular eruption upon the lids or upon the face, with frequent agglutination and photophobia in the morning.

Natrum Mur.—Useful where the lids are inflamed and thickened, accompanied by smarting and burning, with some conjunctival inflammation and a sensation of sand in the eyes. The lachrymation is acrid and excoriates the lids and cheek, giving them the characteristic glossy appearance.

Rhus Tox.—Suitable in some cases where there is heaviness and stiffness of the lids, or an edematous condition with profuse lachrymation.

Sepia.—Scaly conditions of the lids, or small points of pustular inflammation at the roots of the cilia, with a sensation as if the lids pressed too hard on the eyeball.

Staphisagria.—Lids with dry, uneven margins or hard nodules, and much itching and sensation of dryness of the eyes in the morning.

Argentum nit., euphrasia, antim. tart. and merc. nit. may be indicated in cases dependent upon, or associated with, conjunctival disease; other medicines may relieve when indicated by the general symptoms of the remedy without special reference to the eye symptoms.

HORDEOLUM, or stye, is an acute inflammation of the cellular tissue of the free border of the lid, and appears close to or involves one or more cilia. At first a small red and hard swelling, very painful to touch, it soon causes much inflammation and swelling of the part of the lid in which it is located or of the entire lid. It becomes developed in three or four days, on its summit a yellowish point appears which usually ruptures and gives exit to a little pus or necrosed cellular tissue.

It is very apt to recur, and children suffer from their reap-

pearance singly or in groups for weeks and months. The attacks are due to either such causes as general debility, indiscreet diet or the more local one of eye strain dependent upon errors of refraction, and irritation of the lids from various causes.

The effort to abort the stye is rarely successful; as soon as it is well under way hot compresses are to be applied to hasten the formation of pus, which may be evacuated by a slight incision or left to break itself.

Pulsatilla, hepar sulph., or mercurius at times prevent the extension of the inflammation, but more frequently shorten the course of the attack and hasten resolution. Graphites, sulphur, calc. carb., staphisagria and other remedies, when indicated by the general symptoms, may prevent the recurrence of the styes.

CHALAZION is a small, firm, immovable tumor, hemispherical in shape, which develops in the tarsus and arises from closure of the opening of a meibomian gland and the alteration of its normal secretion. When it is of spontaneous origin it usually disappears in a few days without treatment; when, as is usually the case, its growth is slow, its absorption requires time. In children the causes which determine their development are defective nutrition, the accidental closure of the mouth of one of the ducts or inflammation or irritation of the lid-margin.

The development of the tumor may stop at any stage and remain stationary for an indefinite time, its size varying from a large pin's head to that of a large pea, rarely developing beyond this point.

The only disturbance arising from it, except the unsightly appearance given by it to the lid, is the slight pressure or rubbing of the eyeball by its internal projection.

In the majority of cases occurring in children they are absorbed without operation, but when necessary may be removed by an incision preferably upon the conjunctival surface of the lid and the scooping out of the contents of the cyst.

LACHRYMAL DISEASES are ordinarily rare to the physician, but less so to the oculist; but cases due to arrested development resulting in absence of the lachrymal ducts are not uncommon. The overflow of tears which may be noticed sooner or later by the mother or attendants of the infant indicates the fact that the conduits have not been developed or that the nasal portion has not been delivered of its fetal débris. If such is the case, suppuration of the lachrymal sac of one or both sides takes place in the infant, and its subjective redness, swelling, and the pain as evinced by the child's restless discomfort indi-

cate to us the location of the lesion, which may require surgical interference in the way of incision to relieve the pressure arising from the retention of pus. At times the condition is more chronic, and with the prescription of the proper homeopathic remedy and perhaps the additional aid of some local astringent, or a lotion of the remedy indicated for internal prescription will often, when the punctum of the canaliculus is not occluded or contracted, result in the disappearance of the trouble.

When the sac or duct is congenitally absent or has been destroyed by injury, no relief can be obtained for the persistent overflow of tears which becomes more marked and annoying as the child's years increase.

If the closure or contraction of the punctum is the fault, then it must be opened and attention given to the local inflammation of the conjunctiva resulting from the retention in the conjunctival sac, of the secretions which should have passed into the nose.

When this has been done and no relief given, ample investigation of the patency of the nasal duct should follow, and the problem of trying to imitate nature's intention by the formation of a new opening into the nose is to be considered. In view of the necessity, the latter is more frequently accomplished and often is followed by a satisfactory result for the time, but the ultimate effect is not to the benefit of the growing infant.

What, then, is to be done when the judgment which should come from experience determines an operation not advisable in the individual case? Before mutilating the child it may be well to assist nature to do the work so well undertaken, but yet not completed, and by milder measures enable the child to enjoy that comfort which with harsher methods it could not.

With the aid of cocaine we can in some cases, by the use of fine probes, frequently and gently passed to the bottom of the sac, stimulate its development, and finally obtain a canal of sufficient calibre to enable the passage of the secretions from the eye, which may increase in size with the facial development of the child.

The treatment consists in removing the discharge which accumulates at the inner corner of the eye and the use of a mild eye lotion, as that of borax and boracic acid (grs. x. āā to ƒ℥i.), which lessens the irritation arising from the retention of the lachrymal secretions, and tends to improve the septic condition and thus prevent the extension of the inflammation to the conjunctiva of the lids and eyeball. After the eye has been thoroughly cleansed, some mild astringent solution may be either dropped into the eye or used in a lachrymal syringe, when the

lotion may be thrown directly into the sac and forced through the nasal duct into the nose.

The internal medication consists in the use of such remedies as:

Aconite.—Indicated when the mucous membrane presents the same hypertrophied condition which was present in the conjunctival affection which precedes or accompanies it.

Euphrasia.—Indicated in similar conditions to aconite and frequently follows the latter when the discharge becomes thick, yellow and acrid.

Pulsatilla and Calc. Carb.—When there is a profuse, thick and bland discharge, the concomitants deciding the choice.

Argent Nit.—Catarrh of the lachrymal sac, when the discharge is profuse and the caruncle and semi-lunar folds appear red and inflamed.

Petroleum.—This remedy has a marked action upon the mucous membrane of the lachrymal sac when the obstruction is due to thickening of the mucous folds. The temporary stricture is often relieved by it without the necessity of operative interference.

Calendula.—Particularly useful in obstinate cases, when the blennorrhoea continues after the duct has been opened, and the stricture tends to re-form, and should be applied locally, as well as given internally.

Stannum.—Relieves some cases of blennorrhoea of the sac, where there is a profuse, yellowish-white discharge with sharp pain or itching of the inner canthus, particularly at night.

Arsen. Iod.—Proves useful in curing obstructions of the duct dependent upon acute inflammation and swelling of the nasal mucous membrane. It may be suitable in those cases of blennorrhoea of the duct accompanied by a dry ulcerated condition of the nostrils.

Hepar Sulph.—In inflammatory conditions of the sac with sensitiveness to touch, and free discharge of pus with or without an opened canaliculus.

Mercurius.—The discharge is thin, acrid, and often excoriates the lid-margins, or the cheek where the overflow comes in contact with it.

Silicea.—There is a bland, whitish discharge of decomposed mucus and pus from the distended sac after the canaliculus has been opened and probing begun. It may be also indicated in the recurrent inflammatory attacks of old cases of blennorrhoea of the sac.

Many other remedies have been recommended and have undoubtedly been of service in improving the condition, as arum tr., aurum mur., belladonna, calc. carb., cuprum alumina, hy-

drastis, fluor. ac., kali iod., natrum mur., nux vomica, sulphur and zinc. sulph.

STRABISMUS (squint or cross-eye) is a deviation of one of the eyes when looking at an object, owing to the inability of the child or individual to bring the eyes to bear upon the object so that the visual axes meet at the point of the object looked at. In the normal state of the eye muscles, when any object is looked at, the visual axes of both eyes are directed to the same point of the object. When squint is present, both eyes are not equally turned, one eye being directed toward the object, while the imaginary line of the visual axis of the other, passes to one side or the other of the object, and the squinting eye turns inward (strabismus convergens), or outward (strabismus divergens), or upward (strabismus deorsum vergens), or downward (strabismus sursum vergens).

The six muscles of each eye which enable the eyes to assume their varied positions, are, when normal, so evenly balanced, that all motions of the eye in their associated movements are in perfect co-ordination, and the visual axes meet at the object to which the eyes are directed. When from any cause, one or more muscles present an excess, or a lack of innervation, a disturbance of the normal equilibrium occurs. In the associated action of the eyes there is a deviation from their proper direction in looking at an object, and the deviating or squinting eye takes the direction of the strongest muscle.

Strabismus is an objective symptom arising from various causes. If it occurs in acute illness it is a grave prognostic. It may occur as a reflex of the stomach and intestines, from worms, or other scources of local irritation or inflammation; from meningeal and cerebral lesions, which may cause tonic spasm and paralysis of certain of the eye muscles.

In the convulsions of infancy, squint is often a symptom which becomes permanent, or afterwards disappears. When the eye becomes crossed in the course of tubercular meningitis, it is a symptom of approaching death. Whooping cough, measles, scarlet fever, diphtheria and other diseases of childhood are fruitful causes of strabismus, owing to the enfeeblement of one or more of the eye muscles during or following the disease, and a consequent disturbance of the balance of the relative powers of the muscles. An eye in infancy or childhood during its exclusion from light and the associated visual acts of its fellow, owing to the bandaging which may be necessary for its restoration to health, is not infrequently found to turn inward or outward when recovery from the inflammation or ulceration is complete. When the vision has been partially

lost as a result of such inflammations, the squint may appear at a later period. Various other causes are assigned by the parents for its production, but their etiological value are too often impossible for the ophthalmic surgeon to determine. Squint rarely exists at birth and is developed usually as the result of the close approximation of the infant's near-point and its effort to observe objects attentively. At first it may only be observed occasionally (periodic strabismus), or noticed perhaps in one eye and again in the other (alternating strabismus), or later becomes a permanent squint of one or both eyes.

The common cause of this deformity is that which arises from the imperfect development of the optical apparatus, the power of accommodation or other defects which affect the reception and transmission of the objects looked at. There is still a difference of opinion as to the origin of the strabismus and the loss of vision which occurs in the squinting eye.

That there is either an early innervation of the muscles, an ametropic condition of the refraction, or a loss of central vision in many cases, all agree. The question as to the cause of loss of vision in the squinting eye, whether due to the suppression of the image (amblyopia exanopsia), or defects of the retinal function still remains undetermined.

Treatment.—When strabismus still persists after the acute disease which may have produced it has passed, and the deviation is due to paralysis of the opposing muscle, attention should be directed to the improvement of innervation of the paretic muscle by galvanism and such remedies as may be indicated by the concomitant symptoms.

As the common cause of non-paralytic squint is either a natural preponderance of the internal recti muscles over the external or a hypermetropic or other defective conditions of the refraction with their increased demands for convergence, we have first to correct the ametropic refraction with properly adjusted glasses. This is usually impracticable under four years of age, as while it is possible to determine gross errors of refraction in young children with the ophthalmoscope, the use of glasses thus prescribed are usually of no value and certainly in the majority of cases a matter of great anxiety to the parent or attendant of the child. Bandaging the non-squinting eye for stated periods each day, or the use of atropia to paralyze the accommodation continually or daily exercise of the muscles by prisms afford much better results in the majority of cases in very young children. With increased age, the development of the nose-bridge and the medial sinuses, by increasing the pupillary distance causes a disappearance of many convergent squints. The development of the eye, and its muscles accompanying

that of the head and face results in an ability to co-ordinate the muscles properly. In all cases special attention should be given to improve the general nutrition which is too often at fault. When, however, by the use of such remedies as gels., arg. nit., cicuta, cina, belladonna, hyoscyamus, jaborandi, spigelia and santonine, which may be indicated, both by their direct action upon the muscles at fault or when such other measures as those already stated have been of no avail, it is necessary to make a tenotomy of the muscle which exhibits the greater over-action. When the operation should be done, and its extent, can only be determined by the ophthalmic surgeon, when he has assured himself that all else has been done for its non-surgical cure. In the event of an operation, in young children particularly, it is well to do too little rather than too much, as the full correction or over-correction is not always apparent until some months have passed. The operation is made ordinarily for its cosmetic effect, as in the majority of cases the vision of the squinting eye is not recovered as a result of the operation and should not be expected, nor should the glasses which have been used to correct the ametropia, be expected to be discontinued, as the tenotomy which has corrected the deviation has not removed the refractive error which still persists as an active cause and tends to reproduce the squint. For the technique of the operation reference should be made to special works upon the eye.

When the strabismus is due to paralysis, operative measures are not to be undertaken until all possible chances of recovery have passed, and then not with the expectation that anything can be accomplished except to lessen the cosmetic defect.

HETEROPHORIA, is a term given by Dr. S. T. Stevens, of New York, to a disturbance of the equilibrium of the eye muscles, and is a condition which, while formerly considered under the term muscular insufficiency, has, owing to his investigations, become a condition of greater importance as regards its determination and the effect upon the use of the eyes and those reflex conditions which may follow certain derangements of the eye muscles. In general explanation it may be said if the eye muscles are of normal equilibrium, orthophoria is present; if this equilibrium is disturbed, then heterophoria is present; the visual lines in the former being parallel, while the latter, owing to muscular insufficiency, tend, as in strabismus, to deviate. The heterophorias are subdivided into esophoria, when the visual lines tend inward (insufficiency of the external recti); exophoria, when they tend outward (insufficiency of internal recti); and hyperphoria, when that of either eye tends upward.

The determination and measure of these muscular deficiencies is accomplished by the use of prisms, which are successively placed before the eye whose muscles' strength is under examination, both eyes being directed upon a candle or other source of illumination at a distance of twenty feet, the thin edge of the prism being placed in the direction of the muscle under examination. The degree of the strongest prism thus used, which still enables the individual to maintain single vision, gives the strength of the muscle tested, and is to be compared with approximate standard for that muscle. Various modifications of this simple test are often necessary to determine the individual loss of equilibrium which may exist, and it should be borne in mind that all such values are only relative.

The causes of the heterophoria are those arising from malnutrition, rapid growth, innervations incident to approaching puberty, eye strain dependent upon errors of refraction, and depressions of the muscular and nervous systems accompanying or following exhausting diseases.

The presence of these insufficiencies of the ocular muscles are undoubtedly the cause of much discomfort to children in the use of their eyes, headache, and perhaps more neurotic symptoms, as chorea and epilepsy. It should be said, however, that they are more frequently the reflex of disturbance of remote organs, than they are cause of the many affections attributed to them.

The treatment consists primarily in the correction of the nutrition; correction of the optical defects by the use of glasses; the regulation of the use of the eyes; proper exercise and good hygiene; the methodic exercise of the eye muscles by means of prisms, and in the failure of these, a graduated tenotomy of the stronger muscle may be made, but always with the greatest of care, and when only there seems no chance for natural recovery of this weakened power of the muscle in the child.

THE USE OF GLASSES.—Amatus and Friar Bacon discovered during the thirteenth century, that a bit of glass with a convex surface, when placed before their eyes, enabled them again to see with eyes that had become dimmed by the changes incident to their advancing age. This invention and its practical application has been of inestimable advantage to the world; improving sight at all ages, lessening the number of the blind, lengthening the days of the aged, advancing civilization and making the world brighter and better for all.

The question is often asked, Why do so many children wear glasses now-a-days? The frequency with which one now meets children of all ages wearing lenses is rather startling to the

many who do not appreciate the possible needs which require their use nor know of the good which is accomplished by them.

As the child passes from infancy to childhood, defects and disturbances, before unnoticed, now become fully recognized as the child attains an age when it can communicate them. Again, as it begins also to exercise the visual function more closely and for a longer time, this is particularly true of those children who are placed in kindergartens, where the character of some of the work to which they are put is such as to strain the eyes of those much older and stronger. While the work itself does not cause the defects of vision or muscular insufficiencies which we frequently find to be present, it does bring out these defects at an earlier age than under other circumstances. When children begin to use their eyes intelligently upon the objects around them, an inquiry should be made into the power and extent of the visual function. It is an error for the parent to consider that the child must have, by reason of its birth, eyes of the same formation, visual power and endurance as his own. The examination of many thousands of children's eyes exhibits the fact that the proportion of normal eyes is only about 11 per cent.; the balance exhibiting various refractive errors, as hyperopia, myopia and astigmatism in the order given. The presence of these defects interferes both with the vision and also with normal and comfortable use of the eyes. In the effort to see, the child is compelled to exercise an undue amount of force in trying to overcome the defect. The continued effort thus needed results in a rapid exhaustion of that reserve energy which is needed for the maintenance of the normal equilibrium of the general nervous system. Complaint is made of the vision and the eyes, the head suffers, various reflex nervous symptoms are excited and the condition presents a serious aspect.

The confinement of the child to the too often impure air of the school room, the forcing process common to our school system of to-day, the method of education by means of the eye in which learning is acquired by writing, all tend to weaken both the child's physical condition and the eyes as well.

With the acquirement of exact knowledge of the eye condition, its various defects and needs, the ophthalmic surgeon finds that the correction of the errors of refraction by properly adjusted glasses results in a restoration of the vision, relief of the eye strain, improvement of the disposition of the child, in the disappearance of many obscure nervous symptoms which were undoubtedly reflex, and sometimes the cure of an apparent idiocy due to mental deficiency.

The use of glasses at an early age also enables the vision to

be retained in many cases which otherwise would be blind before puberty; again by their use the imperfectly developed eye may be stimulated to such an extent as to acquire during the early years of life a more nearly normal condition. In all cases where glasses may be indicated the greatest care should be exercised in their selection and adaptation to each individual case, as, when not properly prescribed, they are as capable of injury as those which suit the condition are of good.

SYSTEMIC AND GENERAL DISEASES IN THEIR CAUSATIVE RELATION TO EYE DISEASES IN CHILDHOOD.

Intestinal Diseases, when of an exhausting nature, may present such eye complications as ulceration or abscess of the cornea which threaten to destroy the vision and are at the same time usually prognostic of approaching death. Intestinal irritation due to parasites or other causes frequently produces marked affections of the eyes, such as temporary blindness, attacks of weak vision, photophobia, unequal dilatation of the pupils, strabismus, morbid nictitation or nystagmus.

Dentition.—During the eruption of the teeth the eyes exhibit a tendency to exacerbation of any existing eye inflammation and the development of such affections as blepharitis marginalis, phlyctenular inflammation of the cornea and conjunctiva, mild attacks of catarrhal conjunctivitis and hyperemia of the conjunctiva with lachrymation.

Scrofula exhibits usually such superficial affections of the eye as inflammation of the lid-margins, phlyctenular inflammations of the conjunctiva and cornea, which are characterized by tediousness, recurrence, and slowness to respond to treatment.

Syphilis produces a varied and profound effect upon the eyes of children as well as adults, and any tissue of the eye may suffer from its ravages. Acquired syphilis as a cause of congenital changes in the eye has already been referred to, as well as that form of parenchymatous keratitis which appears between the ages of two and fifteen years and rarely in after life. Inflammation of the iris, choroid and retina during the first three or four years of life are not uncommon. Owing to the delicacy of the structures involved, the inflammation resulting from the dyscrasia, together with the persistent character, which marks the attack, the danger to the sight of the child becomes very great.

Rubeola is a prolific cause of certain eye affections. At its inception a mild catarrhal conjunctivitis with a more or less marked photophobia is usually observed. This condition may

pass rapidly into a muco-purulent conjunctivitis in some cases, or even a dangerous purulent ophthalmia of a croupous variety may follow and be destructive to the eyes. The greater number of eye diseases due to measles, however, appear as sequelae and by no means always following immediately after the attack of the eruptive fever. It would seem, from the great variety of eye affections which are traceable to rubeola, that no other disease of childhood presents so great a number of eyes of impaired vision or function. Undoubtedly the poisonous effect of the exanthem in perverting the nutrition of children already predisposed to malnutrition from various causes, accounts for the development of various diseases of the lids, cornea and conjunctiva, as well as those functional affections of the eye muscles and retina which are so common to the oculist. Affections of the optic nerve, such as optic neuritis, may complicate an attack of measles from retrocession of the eruption or follow after.

Rotheln rarely, if ever, presents any eye complication beyond that of a mild conjunctivitis, which usually disappears with the recovery of the child from its attack of false measles.

Scarlatina, while presenting commonly only a transient hyperemia of the conjunctiva, with increased lachrymation coincident with erythema of the skin, sometimes is complicated with a rapid loss of vision ; in one case coming under my observation the blindness existed for four days, and was evidently due to the toxic effect of the disease upon the blood without nephritic complication. Purulent and diphtheritic inflammations of the conjunctiva occur only in those desperate and usually fatal cases of complicated scarlatina. The sequelae of scarlet fever, with the exception of the nephritic and diphtheritic complications, exhibit no such tendency to produce eye disturbances as does measles. When the eruption is repressed, cases of loss of vision have been reported.

Roseola, *varicella* or *vaccina* produce no eye symptoms of direct value.

Variola may destroy vision from ulceration of the cornea ; in rare cases, from the formation of a pustule upon the cornea or upon its margins.

Diphtheria rarely affects the eye in childhood, except by direct inoculation, or from extension from the nose, and when it occurs destruction of both sight and eye follows. As the child recovers from the systemic disease, it is not uncommon to find that the power of accommodation for near objects has been lost. While the prognosis is usually good in these cases, a permanent weakness of the ciliary muscle undoubtedly remains in many cases.

Pertussis in its convulsive stage may cause sudden blindness from hemorrhage within the eye, due to rupture of a blood-vessel of the choroid during the paroxysm, or in other cases from an ischemia of the retina. Spots of effused blood in the conjunctiva from rupture of the capillaries are a very frequent accompaniment of cough paroxysms.

Phlyctenular inflammations of the conjunctiva and ulcers of the cornea are not infrequent sequelae of this disease.

Parotitis rarely exhibits any eye complication, although cases have occurred where there has been a disturbance of the retina with temporary failure of the vision and others presenting a passing effusion in the orbit with paresis of the oculomotor nerve.

Cerebro-Spinal Fever may be complicated with ulceration of the cornea, hyperemia of the optic disc and retina, or even an acute choroiditis, with exudation of lymph in the vitreous and blindness result.

Typhoid Fever seldom occasions any disturbance of the eyes except, in low cases, when an ulceration of the cornea and impaired vision are due to exhaustion. Optic nerve lesions appear as a result of meningeal complications.

Intermittent Fevers in children show a proneness to eye affections, both during the course of the fever and also later. Iritis, phlyctenules, corneal ulcers, strabismus and heterophorias, with all their dangers and discomforts, may attend or follow an attack of malaria.

Rheumatism rarely causes any disease of the eye in children except in extremely rare cases, when an iritis or a mild scleritis may occur.

Diseases of the Heart, even in children, produce certain changes in the eye and disturbance of the visual function, the latter coincident with valvular diseases.

Ex-ophthalmic Goitre, however, is the most common eye disease arising from heart complication. It appears in childhood only at the approach to puberty or soon after the menstrual function has been established. With the enlargement of the thyroid and disturbed action of the heart, there is a marked prominence of the eyes with a partial retraction of the upper eyelids which occasions a peculiar stare characteristic of the disease. When occurring in children it is much more readily cured when early recognized and treated, than in adults.

Hydrocephalus causes impairment of the vision either from pressure exerted directly upon the optic tracts, or from the disturbance of the functional activity of the visual centers by the distention of the brain cortex. The position of the eyes, as they are pushed downward by the pressure upon the roof of

the orbits, gives to the hydrocephalic child a fixed stare which is unique. In the early stages of the disease strabismus or nystagmus may be observed.

Diseases of the Central Nervous System, particularly those of gross character, such as tumors of the brain, rarely find expression in the eyes of children unless due to inherited syphilis, when, as in the adult, optic neuritis may occur before death.

Meningitis, however, presents not only the paralysis of the ocular muscles, but when the inflammation involves the base of the brain, optic neuritis and consequent atrophy are not uncommon.

Diseases of the Sexual System afford many cases of disturbances of the eye relation prior to and at the time of puberty. It is a noticeable fact that a more marked effect is produced upon the eyes of girls at this period than those of boys. The rapid development of the body which occurs at the time of puberty is often preceded by a variety of eye symptoms which are often alarming, in that there is frequently a marked affection of the vision, a disturbance of the equilibrium of the eye muscles from loss of physical tone or occasioned by errors of refraction which before have passed unnoticed. The eye affections thus caused become not only causes of discomfort to the child, but produce reflex effects of both the head and the general nervous system as well. In cases when the headaches, chorea and other now remote nervous symptoms do not disappear when such local causes of irritation as congested ovaries, vaginal inflammation, contracted or adherent prepuce, or the habit of masturbation have been removed, the eyes should be well examined and all refractive errors and muscular defects corrected as far as possible, and often with remarkable improvement in the child's condition.

The effort of nature to establish the menstrual function in the child who has perhaps reached that period of its life when it should pass from childhood to girlhood, is not infrequently attended by various disorders of the eye which may precede the appearance of the menses, accompany them, or remain until the function becomes regular. Morbid winking, chorea of the eyelids and face, spasm of the lids, asthenopia, heterophoria, hysterical loss of vision, neuralgia of the eye, intra-ocular hemorrhages, choriditis, neuro-retinitis and optic neuritis may all arise during this too often trying period of the child's existence. In the male child abnormal nictitation, conjunctival hyperemias, headaches and chorea at puberty are more frequently observed, while the deeper eye affections are uncommon.

Injuries of the Eye in Children—Traumatism of the eye

of the child has, as in adults, the danger to sight or life in proportion to its extent and the location of the injury. Upon the care given immediately after the accident too often depends the recovery or loss of sight. It is impossible to present any single rule for the proper treatment of all the wounds and injuries of the eye which, small as the organ is, when the accidents to which it may be subjected, are so numerous, so frequent, and so dangerous to the delicate organ of sight. No matter how long or broad the experience of the ophthalmic surgeon may be, each case of injury to the eye presented to him may have some variation in cause, location of lesion or effect upon the sight, which will require the aid of all his experience and skill to avoid destruction of sight or eyeball, and yet be compelled to witness the inability of his efforts.

In young children the retention of foreign bodies upon the eyeball or beneath the lids is much more rare than in adults, owing to the lax application of the lids to the surface of the ball, and also to the more active condition of the lachrymal gland, which at this stage of life responds so readily with its shower of tears upon irritation of the conjunctiva. When foreign bodies remain upon the eyeball or beneath the lid, there is apparently less pain referred to the eye than in adults, but a watery, congestive appearance of the eye or an inflammation of the conjunctiva is presented, and the first duty is to look for the cause of the irritation or inflammation which may be discovered in an imbedded bit of foreign substance in the cornea, conjunctiva of the eyeball or lids, the child being less likely to complain of the cause of the trouble than the adult. A drop or two of a two per. cent. solution of cocaine renders the eye sufficiently anesthetic to enable one to examine it comfortably to the patient and thoroughly by the attendant, so as when its location has been discovered to remove it without pain. When not found upon the surface of the globe, the upper lid should be everted, when its location will be found near the center of the free margin or at the angles of the tarsus. Its removal and the application of a cold compress or the instillation of a mild collyrium is usually sufficient to cause a return of the eye to its normal condition in a few hours, unless the irritation and inflammation have been excessive.

The dangerous injuries of the eye from which the child is likely to suffer are those of burns and scalds from hot water, lime and mortar and hot pokers, punctured wounds arising from forks, scissors, pointed sticks or knives. Not infrequently the pet dog, cat or monkey have in my experience produced by accident or intent a laceration of the lids or eyeball. Contusion of the lids or ball from blows or blunt bodies, such as sticks,

balls, pebbles, etc., may cause hemorrhages within the eye, or concussion of the eye sufficient to destroy the function of sight is not uncommon among older children. In all cases the greater danger lies in the effort on the part of the unskilled attendant to do too much. The fact that the child makes little complaint after injury to the eye is too often misleading, as deep injuries to the eyeball, both in children and adults, produce an anesthetic condition which is apt to prevent an early and a proper recognition of their extent or the danger incident to them.

When foreign bodies or masses of dirt or other extraneous substances have found their way upon the ball or beneath the lids, the first thing to do is to remove them with a suitable instrument, or by washing or gently syringing the eye with warm water after rendering the eye anesthetic by cocaine; then ascertain the extent of the injury and its danger to eyeball and sight, and apply cold compresses and such antiseptic collyrium as may be indicated. In cases where penetrating wounds of the eyeball have occurred, while they may seem very slight at first, their ultimate results may be very grave, and the medical attendant can rarely, if ever, err by prescribing a proper solution of atropia, according to the age of the child, to dilate the pupil, and apply cold compresses of ice to the eye. Efforts to determine the extent of the injury by too much examination by unskillful hands result in the destruction of eyes which might be saved.

In all extensive injuries of the eyeball, such as great lacerations or where foreign bodies have been projected within the eyeball, the danger of sympathetic inflammation, which may destroy the sight of the remaining eye, should always be borne in mind. The necessity for the removal of the injured eye to prevent total blindness is often indicated; but in children, where, in the absence of a foreign body within the eye, or the laceration is not too great, it becomes the duty of the ophthalmic surgeon to consider the effect which the immediate removal of the eyeball will have upon the development of the orbit and the side of the face of the injured eye. In all cases, should indications of a sympathetic irritation or inflammation supervene in the other, after injury of one eye, no time should be lost, when by the removal of the injured eye it may be possible to save the sight of its fellow.

Glioma of the Retina and Optic Nerve, or *Fungus Hematodes*, is usually the only malignant tumor of the eyes of children which we may be called upon to consider. It is almost exclusively a cancer of childhood, occurring usually between the ages of one and twelve years; it may, however, appear as early

as the second month after birth. It is probably hereditary and dependent upon a cancerous dyscrasia.

The earliest symptom is a whitish-yellow, or bluish-white appearance of the pupil, which on examination is found to exist behind the lens, and the eye is devoid of vision. No pain or redness is present, and often the case is not brought for treatment until the eye becomes enlarged, or pain and congestion of the sclera occur. As the tumor grows it advances into the interior of the eyeball, producing atrophy and detachment of the retina as it proceeds. With the ophthalmoscope it appears like a detachment of the retina or inflammatory changes in the vitreous, which closely simulate it, and from which it must be distinguished by the absence of iritic adhesion, and from the history of the inflammation preceding the white or yellowish appearance of the pupil. The appearance of the vessels upon the surface of the bulging mass, which do not correspond with those of the retina, will enable us to designate it from other affections. As the tumor increases in size the intra-ocular tension increases, and the pupil becomes dilated and the child complains of pain from the glaucomatous condition which occurs; other portions of the tissues of the globe become involved with the increase of the tumor, and the lens loses its transparency, the cornea becomes opaque, and all semblance of the eyeball is lost in the protruding mass which extrudes between the lids and appears as a fleshy body, secreting a sanious discharge and subject to frequent hemorrhages in the advanced stage of the disease, when it is called fungus hematodes of the eye.

When the disease is recognized in the early stages, while confined to the retina, the removal of the eyeball with a portion of the optic nerve, which on examination shows no sign of implication, is usually favorable. The case, however, is even then not safe until several months or a year have passed without indications of the return of the growth. In the majority of cases the removal of the eye is not acceded to, or the disease has progressed along the optic nerve so that the brain is oftentimes affected, or the contents of the orbit have become infiltrated with cancerous cells, so that death follows at an early date, from intra-cranial tumor or exhaustion due to the cancerous cachexia.

Immediate removal of the ball, with as great a portion of the optic nerve as possible, is imperative when the tumor is confined to the interior of the eye. When it has extended beyond the confines of the globe, the question of operative interference is a grave one, as often the complete extirpation of the contents of the orbit affords only temporary relief, the sarcoma-

tous mass, under these circumstances, seeming to acquire fresh energy from the operative measures.

In extremely rare cases the growth is reported to have been checked and the eyeball becomes atrophied, but this is so unusual, and the general tendency of the disease so fatal, that time should not be lost in awaiting probable absorption. After the removal of the growth, it is my practice to place these patients upon carbolic acid 1st dec. in water, a dose three times a day for several months, and good results have occurred from its use.

CHAPTER II.

DISEASES OF THE EAR.

THE infant ear at birth rarely receives as much attention as the eye, unless an absence of the auricle excites the notice of the attendant or some other deformity is apparent. As the ear is not susceptible to those destructive inflammations due to inoculation from the abnormal vaginal secretions of the mother soon after birth as the eye, it naturally requires less careful examination.

CONGENITAL MALFORMATIONS are, however, too often present as a result of a partial or complete arrest of development *in utero*, and the auricles may be so rudimentary as to be said to be absent on one or both sides. When the auricle is rudimentary, the external auditory canal may also be absent or be closed by a fold of skin, which prevents the passage of sound vibrations to the middle ear. When the auricle is congenitally non-developed, there is usually some rudimentary evidence of nature's effort to complete the work, as is shown by the presence of nodules of skin and cartilage in the vicinity of the site of what should have been an auricle. With the non-development of the auricle, there is usually associated a similar defect in the external auditory meatus and also one of the middle and internal ear, so that surgical interference, which might seem indicated for the purpose of opening the canal, is rarely of any value for the relief of the deafness which accompanies the defect.

Various deformities of the external ear may be present as congenital defects, such as a malformed auricle, where a high degree of hypertrophy is exhibited, or arrest of development and an asymmetry of the two ears confront us; clefts and fissures of the auricle, when present, or when the angle of its insertion may give an abnormal expression to those appendages, as where the auricles are too closely applied to the head or are set at a too advanced angle with the plane of the head. Such anomalies, while not necessarily interfering with the child's hearing, oftentimes cause in the child, as it advances in years, a marked disfigurement, and our efforts toward an improvement of the condition are rarely followed by any gain in

esthetic effect. A congenital fistula, situated in the ascending portion of the helix of the auricle, the opening leading into a blind canal, with a thick, creamy secretion, has been recorded, as well as certain fistulas of the canal communicating with the middle ear. The external auditory canal is more often the seat of congenital abnormalities than that of the auricle, and may exhibit throughout the whole extent conditions of contraction or closure due to cuticular or osseous hypertrophy. With a full development of the auricle and a partial or complete closure of the auditory canal, we not infrequently find, after perforation of the skin or bone which seemed to intervene between the external and middle ears, that the canal ends in a cul-de-sac and that the middle ear is without proper development; hence our surgical efforts for the correction of such conditions are usually without good result.

Congenital malformations of the drum-membrane, the middle ear or the internal ear are rarely noticed in infancy, although they may be present. When the child has arrived at a period of its existence when its mental development seems to be at fault, its speech absent or its hearing in doubt, we often find on examination that there are physical defects of the auditory apparatus which are sufficient to explain these deficiencies. They are usually not remediable, so that the child, when both ears are affected, is a deaf-mute and should be afforded that education applicable to the deaf and dumb which is necessary to make such children bread-winners and intelligent members of the community in which they may reside.

At birth the external auditory canal is filled with a plug of detritus, in which epithelial cells from the epidermis lining it are found mixed with the caseous material which covers and protects the fetus during its intra-uterine life; the accumulation soon after birth dries up and falls out, or later, when attention may be called to the infant's ears and the plug found to be still there, its removal is to be accomplished by the use of the aural syringe.

The middle ear cavity may also at birth have retained the debris incident to its development. This accumulation should pass out through the eustachian tube into the throat, leaving the middle ear in condition for the conduction of sound; it probably does not do so as frequently as is supposed. When this condition, is present, its effect is to cause deafness and retard the hearing perception of the infant, and acting as an irritant sets up a suppurative inflammation which liquefies the mass, so that if the eustachian tube is pervious it passes into the throat, or when the latter does not open under the pressure of the accumulation, the drum-head ruptures and those early sup-

purations of the middle ear which occur during the first month or two of infantile life are explained.

The ear of the new-born does not present that completeness of development which is found in the eye at the same period. The orbits of the eyes exhibit in the infant a much greater development at birth than does the temporal bone in which the auditory organ has its location and upon which its development depends. While the eyeballs and their appendages at birth, when normal, closely approximate the size and shape of those of adult life, the ears present much less advancement in the scale of development.

The temporal bone at the time of birth differs materially from that of the adult, and as the essential portions of the hearing apparatus are inclosed in its structure, the development of the ear is in close relation to its ossification, which proceeds slowly and yet always within keeping of that development of the skull which accompanies the normal physical and mental development of the child.

In the early stages of infancy one looks in vain for an auditory canal of full length or a drum-head in the position of that of adult life. The external auditory canal has at this time of infantile life only its cartilaginous portion, is short and the osseous portion undeveloped; the drum-membrane, instead of being visible as in the adult at an acute angle with the lower wall of the canal, is now found almost horizontal with the upper wall.

The mastoid process, which in the adult temporal bone presents a flattened conical mass with apex downward, is only rudimentary in the infant, and only becomes prominent in a physiological or pathological sense with the progressive development of the temporal bone and that of the child.

The examination of the drum-membrane in early infancy, to determine the value of its presenting condition in connection with other symptoms or diseases of the child, is accordingly accomplished only with effort, and variations in its appearance when seen are only of diagnostic and prognostic value after many accurate observations have been made of other ears by the individual examiner. As the infant becomes more developed, its aural affections increase in frequency and extent and the diagnostic value of the examination of its ears of greater importance, not only in determining the local affection, but also eliminating the ear as a possible cause or complication, as well as presenting often a prognostic indication as well as an aid to rational treatment.

The examination of the ears should always be conducted under such circumstances as enable one to see the condition of the meatus and drum-head; the instruments necessary are a

speculum to dilate and straighten the canal, and a mirror reflecting sufficient light to illuminate the meatus and drum-membrane. The view thus obtained, together with a knowledge of the value of the variations from the normal appearance of these parts when presented, aid us to give a greater certainty to our diagnosis and prognosis of diseases of childhood as well as those of adult life. Obstruction to view of the canal and deeper parts is often due to an abnormal lessening of its caliber or from a superabundant secretion of cerumen, so that it is necessary to remove the accumulation with the syringe before the examination can be completed. If the auricle, which was designed for the collection of the sound vibrations, the meatus for sound conduction, the drum-head to receive, the small bones of the middle ear to conduct still further, and the internal ear and auditory nerve, all possess a normal receptive, conductive and transmissive power, then the consciousness and determinative value of the impressions received and transmitted depend upon the functional power of the sound-areas in the cortex.

Hearing in Infancy.—The human offspring differs in its higher grade of development from the other mammalia as regards the power of audition immediately after birth. The perception of sound in the young of all the higher forms of life is so dulled during the period immediately following birth that it becomes a difficult matter to separate the possible value of the hearing sense from that of cutaneous impression. The function of perfect hearing in mankind being dependent upon a complete developmental expression of the collective, conductive, transmissive and perceptive apparatus of the organ of hearing, it should not be expected that its perfection is attained when the anatomical and histological portion in infancy are found so imperfect.

In a series of experimental observations which I have conducted at various times upon infants, in the effort to determine the power of their auditory function soon after birth, I have found it difficult, as it is almost impossible to have the surroundings in keeping with scientific experiments, so that repeated observations may be necessary to enable one to arrive at a conclusion.

When an examination of the ears, after the removal of the fetal accumulation which fills the canal, exhibits the normal appearance of the infantile ear, the projection of sounds toward the ear, even when loud, discordant or musical, seem to disturb the ten-day-old infant less than vibrations of the same strength transmitted through the floor, its crib or cradle. At this age

the cutaneous sense appears certainly more acute than its auditory sense.

While the general theory of sound-sensation is still in doubt, there are some theories, such as those which pertain to the reception and transmission of sound impressions as advanced by Helmholtz, which remain as yet undisputed. The mode of reception and transmission in the auditory nervous apparatus, however, remain for investigation and speculative thought.

It is still a question whether the optical memory-pictures of infantile life have a greater retentive value than those memories produced by the sound impressions. Owing to the greater development of the eye as compared with the ear at birth, it is probable that the visual impressions at this period of life are more durable than those of sound.

The auditory center, which is situated in the temporo-sphenoidal portion of each side of the brain, has the inherent power, when properly developed, of analyzing the impression of those complex tones transmitted to it, as well as determining the auditory value of all simple sounds and noises which excite it. It also has the power to distinguish for the individual certain musical tones, when a proper impression has been made upon the organ of corti, and transmitted to the auditory sphere of the brain, which results in a conscious appreciation of their rhythmic blending and the interpretation of their musical significance.

In the infant, after the first few weeks of world life, as it begins its perceptive auditory period, the lower and deeper tones are probably alone perceived, hence the mother's lullaby is of a low, if not always a sweet or musical tone. As the infant advances toward childhood, the voice tone of the mother or attendant becomes higher intuitively as the infant shows appreciation of sounds of higher pitch, which are now necessary for the development of the intricate terminal nervous elements of the cochlea. It may be observed, also, that this change of tones becomes necessary in order to quiet the child, by lessening the effect of the other sonorous disturbing elements, which increase as the infant's senses become more acute.

The organs of sense of the infant, like those of the young of many of the mammalia, are capable of educational development in proportion to their individual tuition and the perfection reached in the design of the intricate, delicate portions of these organs. In all animals sight and hearing are susceptible of more rapid development under early and careful educational endeavors than other organs of sense. The circumstances which surround the infant, or the direction of the educational effort toward one organ or the other, may tend toward the development of the retentive memory of the auditory sphere over

that of the optical center. There seems to be little doubt, however, that when developmental conditions are equal, special education of the retentive powers of one sphere may enable it to surpass the other. It is not improbable that the infant learns to recognize the eyes, and perhaps the face of the mother and her voice, before either the face or voice of the father, the child seeming to retain the memory of the mother, not only from more intimate relation, but because the visual and sound associations of her are more frequently impressed.

The lullaby common to all races contains from an ethnological standpoint an interesting rhythmic scale exhibited in the folk-lore of all races, and while its purpose is to induce sleep of the infant, at the same time it affords the stimulus necessary for the development of its auditory power. In the early period of infancy the tones of the sleep-song can produce only the slightest and most evanescent impression upon the auditory sphere of the child's brain, and yet be sufficient to accomplish their purpose. In the study of the probable extent of the hearing power of the infant, we find that the value of our observations is lessened by possible effect of motion to which the child's head is subjected, in the effort to quiet it. The lullabies of any tongue seem often ineffectual unless accompanied by rocking, or other motions of the mother or attendant, which are transmitted to the infant in its early life, when in the arms, lap or upon the back. The Indian squaw, with her crying papoose upon her back, rarely stops to croon a lullaby, but shortens her steps, and with a lifting motion of the body soon provokes a somnolent condition of her offspring. The Javanese father, with his infant swinging below his chest in a sash hammock, hastens his step at the cry of the child and thus quiets it. The disturbance of the fluid in the semicircular canals of the ear, and the effect upon what might be termed the equilibrium sense of the child thus produced, may explain the apparent more potent effect in the production of sleep-anesthesia than that derived from the most musical lullabies.

Perhaps there may be an analogous confirmation of the theory presented in consideration of the fact that whenever practicable, the music which produces a quickened step in military life carries the soldiers on to victory, perhaps because, in addition to their patriotism, their thought of self is diminished by the effect produced upon the function of the semicircular canals of their auditory apparatus.

CARE OF THE EARS.—The question is often asked of both physician and aurist what should be done in the way of the hygiene of the ears and their protection from disease. The

ears of the infant when normal require no attention except that necessary for the cleanliness or protection of the auricle; nature has provided every requisite for the proper care of the canal. The washing of the external ear is as necessary as that of any other portion of the child's anatomy; but beyond this external appendage it is both unwise and oftentimes dangerous to go. In the effort to cleanse what appears unclean, the auditory canal may suffer injury from the attempt to remove the natural ceruminous protective covering of the walls of the canal. Attention should more often be given to the coverings of the head and throat, as undue exposure of those parts, more frequently in climates of rapid changes like ours, result in many ear affections; hence it is well in children to provide for the head, ears and throat a light, soft and warm covering during the fall, winter and spring months. In the washing of the ears it is not necessary nor well to manipulate the auricle too much, in the way of pulling, digging or dragging it, as while it may not be especially delicate of itself, its relation to the middle ear is very close and unnecessary efforts expended upon it oftentimes produce deeper changes which affect both the comfort and hearing of the child.

Washing and wetting the head and hair of the child is often deleterious to its ears, particularly so in those children who exhibit an ear-disease tendency and should only be indulged in under the most favorable circumstances and when the care taken is such as may prevent the accession of cold.

Boxing or pulling the ears of the child, while not only cruel, is likely to be followed by disturbances of the drum-head and middle ear which cause inflammation, affect the hearing and may endanger life.

When the ear is in a normal condition water should not be introduced into it by means of a syringe or in any other way, as it tends to produce not only discomfort but disease, and by moistening the drum-head lessens the hearing at least temporarily and often permanently.

CAUSES OF EAR DISEASES IN CHILDREN.—The peculiar and intimate relation existing between the middle ear and the naso-pharynx, is a prime factor in the production, during the first few years of life, of the great numbers of ear diseases. The close connection of the ears and throat, favors the disposition to inflammatory affections of the middle ears, which constitute the larger percentage of ear diseases occurring in infancy and childhood. The mucous membrane lining the nasal portion of the pharynx, in which we have the openings of the eustachian tubes, presents in childhood a normal, tumid condition, and is

spongy from the rich blood supply sent to it. Between the openings of the tubes, the adenoid tissue reaches its highest development in the third or pharyngeal tonsil. The tendency is always great in every coryza, angina, exanthem, or other disease which affects the nose, throat or pharynx, from the swelling and inflammation of the mucous membrane of these parts, toward an involvement of the ears. The breathing of damp and impure air may exhibit its deleterious effect upon the nasal and pharyngeal mucous membrane, in the production of an inflammation, or a congestion at least, of the mucous membrane of the eustachian tubes, which interferes with the function of hearing, often before there is any apparent impairment of the child's general health.

The eruption of the teeth or their premature decay are fruitful causes of ear diseases in early life. As the process of dentition extends over a number of years, during which there is a disposition to sympathetic irritation of the ears, aural affections are both common and often persistent.

Too frequent bathing of the infant, or its exposure to changes of temperature soon after birth, imperfect drying of the hair of the child after washing, wetting of the feet, or the retention of damp clothing, result in the frequent production of hyperemia and inflammation of throat and nose, which may implicate the ears.

In this climate there is a great tendency in children of any age to catarrhal conditions of the nose and throat, which is increased by their exposure to the temperature variations often present in a single room; the room may be too hot or too cold, often the atmosphere is too dry or too moist for the individual child, so that the temperatural and the hygrometrical conditions of the air of its surroundings afford a frequent cause of ear complication or the aggravation of an existing catarrhal affection.

The close proximity of the brain to the middle ear in infancy, owing to the very intimate connection of the dura mater to the mucous membrane of the tympanum, gives rise, from the frequent variations of the circulation of the child's brain to which it is subject, to the production of hyperemias and inflammation of the middle ear.

In infancy the commonest causes of diseases of the ear may be stated to be the acute exanthemata, dentition, acute catarrhs of the nose and throat, diphtheria and hereditary syphilis. In childhood and with older children, in addition to the above, typhoid fever and pneumonia furnish frequent ear complications, while scarlet fever is the cause of the destruction of more ears than all the other causes cited.

DISEASES OF THE EXTERNAL EAR.—Few affections of the auricle and external meatus are presented except when eczema of the face or tinea capitis of the head causes by extension an implication of the auricle, or when either disease leaves a subacute inflammation of the canal within, or around the region of ceruminous glands, so that a discharge is present, often purulent in character, which results from the dermatitis. Occasionally the canal is the seat of small boils in the ear due to impaired nutrition.

ACUTE CATARRH OF THE MIDDLE EAR.—Earache is the first subjective symptom of middle-ear congestion and inflammation. Acute catarrh of the middle ear is its common cause. It is rarely present in infancy or childhood from such causes as reflex neuralgias. The pain varies in intensity according to the extent of the inflammatory process and the amount of pressure exerted upon the walls of the tympanic cavity. This pain, which is deep-seated, is increased on pressure below the auricle or by pulling it. Together with the pain, there is a sense of fullness, deafness, noises in the ears and some febrile disturbances, the latter often passing unnoticed.

Etiology.—Of the general causes mentioned, as producing ear diseases, coryza is the most common of those of the acute catarrhs of the middle ear, although all other causes mentioned may excite it.

Treatment.—As the earache is the prominent symptom, the efforts for its relief are mainly in the direction of some local medicament applied to the ear canal. Notwithstanding the fact that the practice of dropping something in the ear on the appearance of earache is, and always has been a common one, yet each year we become more and more impressed with its danger, its unreliability for the relief of the pain, and the fact that from its indulgence a simple attack of acute hyperemia, or catarrh, which should be self-limiting, passes into a more severe and often chronic affection of the middle ear.

Relief is only obtained when the treatment of the congestion or inflammation of the nares and naso-pharynx is followed by the removal of the accompanying swelling of the eustachian tubes and middle ear. Our efforts should be directed to this portion of the child's head, rather than to the local medication of the outer auditory canal. The use of the air-bag, the nozzle of which has been placed in one nostril, while the other is closed with the finger, is usually sufficient to open the tubes, clear the tympanum of mucus, and often relieves the earache at once.

The application of dry heat to the auricle, canal, or side of the head, by means of a hot cloth, a hop-pillow, or a hot-water

bottle or bag, often gives immediate relief, or lessens the intensity of the pain, and at the same time affords the safest and best of topical applications.

We have at our command a number of homeopathic remedies, such as aconite, belladonna, chamomilla, calcarea, dulcamara, hepar sulphur, pulsatilla and mercurius, which exhibit remarkably quick results in dissipating the disease when properly indicated.

Acute Suppurative Inflammation of the Middle Ear. — Acute otitis media catarrhalis by its terminology is limited to such inflammatory conditions of the tympanum in which only serum or mucus are secreted as a result of the congestion or inflammation of its lining membrane. It is, however, always the pathological precursor of the suppurative and more destructive inflammation of the middle ear, and from which it differs only in the intensity of the symptoms and in the formation and collection of pus instead of serum or mucus in this small cavity. As in all cases where pus forms, a corresponding destruction of tissue accompanies it; and when the discharge from the ear is of a purulent character, we should recognize its appearance as an indication that a more dangerous condition than a catarrhal one has involved the ear, with danger to its tissues as well as to the hearing.

When pus is found in the external auditory canal, it is commonly an indication of a rupture of the drum-head, due either to surgical interference (paracentesis), or the result of nature's effort to relieve the pressure of the imprisoned pus behind it, and to lessen the danger of further destruction or complication. Hence, it is usually symptomatic of the presence, or prior existence, of a suppurative inflammation of the middle ear, which has destroyed the drum-head to a sufficient extent to enable the discharge from the tympanic cavity to present itself in the canal. It is to be remembered that it is not always pathognomonic of middle-ear disease, as it may be accounted for by an inflammation or ulceration of the dermoid and osseus portions of the external auditory canal. During infancy or childhood the drum-head is much less dense, ruptures more quickly and easily, and shows a much greater reparative power, than in adult life.

Etiology.—The same causes which produce the catarrhal variety, are still active in the suppurative form. Here, however, scarlet fever is the most prolific of all causes, measles and diphtheria being next in order of frequency. Sea or fresh-water bathing is responsible for a large number of cases in older children.

The symptoms are the same as those of the acute catarrhal form, intensified. The pain is more severe, but is generally relieved by rupture of the drum-head, and the consequent discharge of pus. This rupture may occur within a few hours after the attack has appeared, or more frequently after the earache has lasted two or three days. If the drum-head is examined before this takes place, the membrane is found congested, dull, soggy in appearance and bulging outward; if the examination is made after, the canal or meatus is found full of pus. If the pus is removed from the canal by gentle wiping with absorbent cotton, or gently syringed away, the point of rupture is readily seen by the pulsation which is presented at the spot.

In the course of the disease, there is in the beginning an acute inflammation of the eustachian tube which causes its complete obstruction, so that the secretion of pus, following the inflammation which has already passed to the walls of the middle ear, not being able to find an outlet by way of the tube to the pharynx, is confined in the tympanic cavity. The pressure thus exerted upon the walls, tends to extend the inflammation upward through the roof and involve the brain, backward to the mastoid, or distends the drum-head, and at the same time softens it by the inflammatory products thrown into it, until it finally gives way with a greater or lesser destruction of its tissue. The size of the opening thus made, may vary from the most minute rupture, to complete destruction of the whole drum-head; as a rule, the extent of the rupture or destruction being greatest where the inflammation is accompanied by impoverished blood, as in those malignant cases of scarlet fever, diphtheria and measles, when the destructive process usually involves all the essential portions of the middle ear.

Treatment.—While both the acute catarrhal and the suppurative forms of inflammation of the tympanic cavity tend, like many other acute diseases toward recovery, when the discharge does not cease or the ruptured membrance heal within the first week or two following the attack, the result is to produce a chronicity which increases with the age of the child. Hence, the earlier the treatment is applied, which carries with it a full knowledge of the condition, after a proper and careful examination has been made of the ear, the better the result in reparation of the lost tissue of the membrane of the drum-head, and the restoration of the hearing function as well as the prevention of a chronic condition of the middle ear, which may menace the life of the child and destroy or lessen its hearing at any period of its subsequent life.

The belief, which has been so common in the past, both

among physicians and the laity, owing to their ignorance of the pathological conditions of the ears in these cases, that the child would outgrow the discharge from the ear, has caused deafness and death in thousands of cases, when proper treatment might, at an opportune time, have prevented both. In many cases, similar results have occurred from ill-advised, or too vigorous, treatment in cleansing the ears with the syringe, or by the application of the various preparations which are intended to control the discharge.

In the majority of cases of both the catarrhal and suppurative variety of middle-ear diseases occurring in children, it is usually only necessary to remove as far as possible the discharge by wiping the more external portion of the canal with a swab of absorbent cotton and the application of a little boracic acid to render the secretion less septic. The use of the syringe and the accompanying water with its disinfectant or antiseptic solution added, while washing away the pus at the same time, unless the canal and drum-head are carefully dried with the cotton-swab under a good illumination of the canal and drum-head, results in the retention of a portion of the fluid which, if not already warmed, as all solutions introduced into the ear should be, soon becomes of the temperature of the surrounding parts, and the elements of a poultice, heat and moisture, are presented to the tissues; this is followed by more or less maceration with consequent stasis in the circulation and a retardation of the healing process, and at the same time tends toward the extension of the ulcerative process and further destruction of tissue.

During the last ten or twelve years, with a better knowledge and a wider experience in the treatment of both the acute and chronic suppurations of the middle ear, results of treatment of those conditions have been much more brilliant and satisfactory than those of the years before. The substitution of the dry for the moist treatment, the introduction of boric acid, resorcin, peroxide of hydrogen and other topical remedies to our armamentarium have largely increased our percentage of cures over former years.

As the acute form tends so often to become chronic, we shall find that it is only after the nose and naso-pharnyx have received proper treatment, and all anomalous conditions there presented are removed, that the ear disease responds promptly to treatment, relapses do not occur as before, and a permanent cure of the inflammation and its accompanying discharge is secured.

Prognosis.—This is not so favorable as in the non-suppurative variety, but the early intervention of proper treatment

renders the prognosis much more favorable than is generally supposed. The majority of uncomplicated cases occurring in otherwise healthy children terminate in complete recovery. When during scarlet fever, measles or diphtheria this affection appears as a complication, the prognosis is usually bad, as the destruction of the parts of the ear is often extensive, with greater tendency to the formation of adhesions and extension of the ulcerative process, owing to the lowered vitality of the febrile condition.

Results.—Recovery with complete or partial restoration of the hearing power. Chronic suppuration; mastoid complication; periostitis, necrosis and caries of the temporal bone; meningitis; cerebral abscess; pyemia and death.

When in the opinion of the medical attendant it is deemed advisable to perform paracentisis of the drum-head, the most bulging portion, which is usually found to be the lower posterior segment, should be selected for puncture. With a good illumination of the parts a paracentisis knife is carried through the membrane, and upon the withdrawal of the knife a quantity of pus follows through the perforation, usually with considerable relief of both the pain and the inflammation.

In the internal medication for acute suppurative otitis media we find such remedies as aconite, belladonna, calcarea carb., ferrum phos., hepar sulph., mercurius, silicea and sulphur affording good results from their exhibition.

CHRONIC SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR.—This is one of the most common affections of the ear occurring during childhood, almost all cases in which there is a discharge from the ear being due to this disease. It is usually the sequel of the acute form, but cases present themselves in which a tendency to chronicity may be said to be exhibited in the beginning, as in those cases occurring in tuberculous subjects, or when they are the accompaniment of pulmonary phthisis.

Etiology.—Scarlet fever, measles and diphtheria form the most frequent causes, as during the acute period of the ear attack, the destruction of tissue has perhaps been great, the vitality of the parts so lowered by the impoverished blood occasioned by the general disease that the healing tendency is very much diminished. Abnormal conditions of the nose and upper pharynx when present tend to cause the acute variety to pass to the chronic, notwithstanding the aural treatment.

Symptoms and Diagnosis.—The discharge of pus from the ear is the common symptom. The quantity varies in amount from that just sufficient to moisten some portion of the

walls of the tympanic cavity to constant flow from the ear, which fills the canal and flows down the neck or face. There are cases in which the pus found in the middle ear passes through the eustachian tube and is discharged into the throat and finally find its way into the stomach. Deafness is always present, varies in degree, from an almost inappreciable loss to total deafness. This variation is not dependent upon the size or location of the perforation, but upon the changes which have affected the tension and mobility of the drum-head. The ears are rarely complained of; pain is exceptional, unless there is an acute exacerbation of the disease.

The character of the discharge is dependent upon the condition of the tympanic cavity and meatus. The pus in a typical case is then laudable, and as the parts heal the secretion becomes more thin and scanty. When mixed with mucus it is stringy and hard to remove. When the mucous membrane of the middle ear is denuded of its epithelium, very much swollen, or granulatious and soft polypi appear upon its surface, the discharge is often mixed with blood. The odor of the discharge depends somewhat upon the care given the ear; where the pus is allowed to remain and the ears are neglected it becomes very fetid. When the odor is bad in cases where proper cleanliness is indulged in, it is usually due to a diseased condition of the bone, and it is particularly indicative of this when, in addition to its fetor, it presents a brownish color. Occasionally the discharge is made fetid by admixture with an altered secretion from the ceruminous glands.

Perforation of the membrane of the tympanum is the almost invariable accompaniment of chronic suppuration of the middle ear. The presence or absence of the opening alone enables us to determine, when pus is found in the canal, whether the condition is one of middle-ear disease or a diseased condition of the canal. To determine its presence or absence the canal must first be cleaned of any discharge, the deeper parts of the ear well illuminated, when, if the perforation is of any extent, it is readily distinguished by the appearance of the reddish mucous membrane lining the inner wall of the drum cavity in the white frame afforded by the remaining portions of the drum-membrane. When the opening is very small it is only detected by forcing air through the nostril by some method of inflation when, passing through the opening, a whistling sound is heard.

The size and shape of the perforation varies greatly, from the most minute opening to that of complete, or almost complete, loss of the entire membrane. It is usually located in the lower and posterior portion when of moderate size, and when very large commonly involves the lower half. The relation of the

size or location of the perforation to the loss of hearing, as already stated, is a difficult one to determine on inspection. In proportion as the opening lessens or changes the tension of the drum-membrane, or the inflammation which caused it has disturbed the mobility of the ossicles, is the hearing power diminished. If neither the tension nor the free movement of the ossicles is interfered with by the perforation, no serious deafness accompanies it.

The sequelas mentioned under the acute suppurative process are to be noted as occurring more frequently under the chronic form. Such complications always render the prognosis very grave, both as regards life and hearing.

The prognosis in the majority of cases, with the improvement in our methods of treatment, is much more favorable than formerly. But as the condition is always a serious one and as long as it exists is a menace to life, our prognosis must be guarded.

Treatment.—The whole effort in the treatment is to be directed toward the restoration of the tissues of the middle ear to a healthy condition ; when this is accomplished the discharge usually ends. The improvement in the condition of the tissues is usually followed by a healing of the perforation when the opening has not been too large. The return of the ear to health restores the hearing in whole or in part, but continued treatment is usually necessary to improve the hearing, when deficient, by lessening the adhesions and other changes which have occurred in the ear as a result of the prolonged suppuration. In the treatment it is necessary to have the discharge removed with sufficient frequency to prevent the maceration of the membrane with which it comes in contact. As already suggested, this is better accomplished by the dry method in which swabs of absorbent cotton are used to remove it. There are some cases, however, in which the syringe is better indicated, and after its use all the moisture left in the ear should be absorbed by cotton introduced for the purpose. The invention of peroxide of hydrogen and its effect, when used in the ear by thoroughly removing and destroying the purulent secretion, has done more than any other remedy in aural therapeutics to increase the percentage of cures in these cases. When the discharge has been thoroughly removed, it has been customary to apply some astringent solution or powder to the inflamed surfaces. There seems to be a consensus of opinion of the otologists of to-day that the application made should be dry, and of the great variety of powders used in this way, boracic acid presents superior claims. In the use of boracic acid the amount applied should vary with the quantity of dis-

charge. If the discharge is full and free, the external canal should be filled with it ; and as the discharge becomes less under treatment, it is better not to pack the passage with the powder, as it is then more likely to cake and form a hard plug which is removed with difficulty and which, when *in situ*, may cause serious trouble by confining the pus in the middle ear. The frequency of its application depends upon the quantity of the discharge and it may require daily repetition of the process. Its introduction into the ear is readily accomplished by the use of the common powder-blower.

After the process has been finished, a small wad of cotton should be placed in the ear to prevent the powder falling out, and also afford protection to the tympanum from atmospheric changes. Proof alcohol may sometimes be applied to the tissues of the middle ear with good effect.

Where exuberant granulations or polypi spring up during the course of the disease, they should be removed by the application of caustics, such as nitrate of silver, resorcin, chromic acid, bichromate of potash or perchloride of iron, as may seem indicated from experience for the individual case. The greatest care should be taken in their use to prevent destruction of good tissue and to limit their action to that portion which we wish to destroy. When, as in case of polypi, the mass is too large to be rapidly reduced by applications of caustics or astringents, the use of a wire snare or the curette becomes necessary. After granulations have been destroyed or the polypi removed, it is necessary to treat the part from which they were developed until it has become covered with epithelium or scar-tissue, which prevents their recurrence.

Mastoid complication is very rare, except that superficial form which exhibits itself as an abscess over the mastoid portion of the temporal bone. As the mastoid cells do not develop much before the age of puberty, we do not have the dread complication of true mastoiditis to deal with, as in adult life. The skin over the mastoid often becomes tumid, red and the part painful, and pus forms beneath the skin or periosteum covering the rudimentary cells of the mastoid, and requires only moderate poulticing until the abscess may be lanced with relief to the imprisoned pus without the more extended operation necessary in later life, which requires the opening of the bone cells.

If the single cell or antrum of the child's undeveloped mastoid becomes inflamed and pus forms, the abscess tends to discharge itself through the thin cribriform outer plate of the rudimentary mastoid, and point in the softer tissues covering the part.

Periostitis, caries and necrosis require attention during the

course of the treatment of chronic suppuration as they appear, but like other sequela already mentioned as complications of the disease, they require such care that the discussion of their treatment would be out of place in a chapter devoted to the consideration of those more common diseases of the ear occurring in children.

The general health of the child must in all cases receive due consideration; proper hygiene and improved nutrition are the greatest of aids in the effort to cure this disease. We often find these patients suffering from dyscrasias, or low conditions perhaps due to malnutrition, and before attempting to cure the ear disease we shall save time if we will devote attention to those measures which would result in the improvement of the general health. A proper, and often a specially nutritious, diet, fresh air, and the improvement resulting from them will again and again indicate to us, that the ear is only a part of the whole, and that the condition of the part depends in its local affection upon the condition of the whole.

When we have removed the exciting causes as far as found, or improved the ear condition as far as possible by such local measures as may be expedient, we should look closely into the symptoms, both local and general, which may give us the indication for the prescription of the homeopathic remedy which will result in the curing of cases which otherwise would go on to further destruction.

Among the remedies which may be indicated, there are few in addition to those already mentioned under the head of the acute variety; but it will be well in cases of doubt to read carefully the general aural indications of the more common remedies, which may be indicated in ear diseases, and which are found on page 141.

CHRONIC NON-SUPPURATIVE CATARRH OF THE MIDDLE EAR.—This disease has for its most significant symptom an impairment of the hearing. The deafness, while not always readily recognized, is more or less marked, or may even be complete, long before there is more than a suspicion of the defect arising in the minds of the child's attendants. Its beginning in children, as well as in adults, is so insidious that it is only brought into recognition and relief sought, when the deafness arising from it is so great as to become sufficiently noticeable, and to call into question the want of proper intellectual development for the child's age. The child may show slow or no response to calls or queries addressed to it in the ordinary tones of conversation; when its age is such that otherwise, from a normal hearing apparatus and well-developed function, it should

be able to respond properly to the interrogative sound impressions which are directed to, and impressed upon it.

Symptoms.—The deafness, which varies from day to day, and is worse frequently when the weather is damp or cold, or from coryzas which assail the child, presents the most common symptom.

Subjective noises in the ear are, in the child suffering from this affection, rarely spoken of, except in older children, and even then only when questioned as to their presence. The sounds as noticed by children are usually of a singing or ringing character, and are often absent entirely; or a crackling sound on swallowing is described. The more frequent cause of complaint is that the voice sounds are like those which are produced by many talking in a room; in fact, sounds are confused, and there is no clear conduction or proper reception.

The examination of the canal and of the external meatus reveals, perhaps, a want of cerumen or a hyper-secretion of it. The latter is the more common condition in youth, while its absence is the usual accompaniment of the same condition of the middle ear in the adult.

The drum-head exhibits changes in position and appearance, and when retracted it presents a dimness of color, or loss of brilliancy reveals to us the changes which have occurred in the middle ear, and which account for the loss of hearing in the individual case.

In children old enough to talk, the vowel sounds are often mistaken for the consonants, or mistakes are made in the repetition of words during the testing of the hearing, as "pin" for "man," or "man" for "pin;" or "four" for "more." And it will often be found that the hearing is so deficient, that words are only properly repeated by the child when pronounced in a loud tone within a few feet or inches of its ears.

Earaches occur as the result of an acute exacerbation of the chronic catarrh, and indicate only a passing increase of congestion of, or a severe inflammation of the middle ear.

The external ear, and the tissues in immediate connection with the external auditory canal are often sensitive to atmospheric cold, to touch or pressure, or the necessary manipulation undergone during the washing of the ears.

Sneezing is not uncommonly an accompanying symptom of catarrhs of the middle ear.

Etiology.—The causes which lead so often to affections which produce in infancy, childhood, or adult life direct loss of hearing, have been considered under those diseases of the ear already discussed in this chapter under the topical headings of the acute and chronic suppurative or purulent inflammations

of the middle ear. In the chronic affection of the middle ear, when the disease presents a hypertrophy, hypersecretion of mucus, or a thickening of the membrane lining the cavity or enveloping the ossicles, then diseases to which the parts have already been subjected by the inflammatory processes enumerated, present a direct and indirect causative relation. The sequela of all those diseases of the infant or child which it has passed through may leave as their aftermath an impression upon the essential portions of the auditory organ which finally result in a deafness too often progressive and complete. The exanthemata thus produce directly or indirectly more cases of deafness during the early period of childhood than all other diseases, and present the same proportionate causes of deafness in the adult.

When the factors just mentioned are eliminated from statistics which show the etiological percentage of deafness, we find both in childhood and in adult life, particularly the latter, that the loss of hearing is due to those catarrhal affections of the nose and naso-pharynx which are so common in our climate. One may become as fatigued discussing the question of possible cure of general catarrhs as he does of the consideration of the necessity of having so many bespectacled children about us. The onset of a catarrh, which invades the nose and throat and involves the ear, and which should require early attention, is so often unnoticed in the beginning that it is only when the direct affection of the middle ear exhibits a marked impairment of the hearing, or when a succession of colds affecting the head which are accompanied by a temporary lessening of the hearing-power, finally present as an accumulative effect a hearing-loss which is sufficient to be noticed by the child's attendants.

When the child suffers from recurrent attacks of cold confined in its expression to the head or nose, and as a result breathes through its mouth, or when old enough its articulation has a nasal intonation, or its hearing power is questioned, the examination of the nose, throat and ears may reveal the cause of the discomfort of the child and the condition of the ears which causes its deafness.

There can be little doubt that heredity as well as climate is a predisposing cause of catarrhal middle-ear affections of a chronic nature, with progressive changes which are followed by deafness.

The hygienic conditions of our houses, the defects in ventilation and sanitation, both in our houses and the schools in which we live or place our children, are so often at fault that we have little need to wonder at the increasing number of cases of middle-ear catarrh which daily seek treatment.

Prognosis.—The course of the disease is usually slow; the variations which occur in the mucous membrane, whether one of proliferation or of atrophy, finally result in changes that cause a retraction of the drum-head, the stiffening of the chain of ossicles, and general impairment of at least the receptive and conductive portion of the ear, which is followed by a progressive loss of hearing.

The prognosis in childhood is far more favorable than in adult life. The early treatment of the nose and throat and the direct care of the ears cure and remove the chronic tendency in the majority of cases thus treated.

Treatment.—The treatment of this disease depends upon the exciting causes which have given rise to it and the character of the affection of the tissue of the middle ear. In infancy and childhood the catarrhs of the nose and throat partake of the hypertrophic form, wherein there is a moist rather than the dry catarrh which is found more frequently later in life.

An examination having determined the form of catarrh which involves the nose and throat, we proceed to relieve that by proper treatment, as in so doing we remove the cause of the origin of the middle-ear affection or its aggravation. In the treatment of these parts sprays are of great value, the medicinal components of them depending upon the particular condition of the membranes presented. They may be antiseptic, cleansing or therapeutic, as the judgment of the physician may deem advisable. Snuffing fluids up the nose or the use of the nasal douche should be discontinued by every medical adviser. The danger of exciting acute middle-ear inflammations is great, as when the fluid passes to the post-nasal portion of the pharynx the involuntary action of swallowing being followed by an opening of the eustachian tubes, the fluid is carried into the tube or into the middle ear and an acute inflammation of the tympanic cavity is the result.

Popular catarrh remedies, which from their advertisements should enable us to find in them a cure for all cases of catarrhal deafness, seem, when used, to increase the number of aural affections, by the irritation of the nose and naso-pharynx from insufflation of the powders or snuffing up the fluids of which they are composed.

As the air-passages of the head were designed for the purpose of preparing the air we breathe for its proper change in the lung-tissue, due consideration should be given to the condition of the nose and throat, and at the same time the after-effects which a too vigorous treatment of the parts may have upon the welfare of the child in regard to its lungs or aural organ.

In the effort to remove the exciting or aggravating causes of this disease, there is much to consider in both the improvement of the hygienic conditions of the child as well as the treatment which is to be directed to the aural condition.

Whenever there is a chronic ear tendency, as evinced by occasional deafness or recurrent attacks of ear-ache, or discharge from the ear, the clothing of the child is to be inquired into, as well as its nutrition. Wet feet and damp clothing promote diseases of the aural as well as all other organs of the body. In our climate, which from the writer's observation, is no worse than others, there is a necessity for skin-protection which seems from experience only to be gained by the use of wool underclothing in these cases during all seasons. The adult or the child with a vigorous constitution may replace its flannels with cotton as the season advances toward summer, but we find that the changes from heat to cold to which we may be subjected in this climate provokes, when the skin is not protected by a garment containing in its composition a fair proportion of wool, both aural and general catarrhs.

While all climates may have their defects and at the same time, aggravate, lessen, or cure general and aural catarrhs, when the question is asked, Where we shall take our child that it may be relieved of the effect of the sudden changes incident to its place of habitation, or avoid, or lessen the possible climatic effect upon its catarrhal condition, both general and aural, the climatologist gives only a general rule, which does not enable us to answer the question properly. It does not matter always how good a student one may be of climato-therapy, if he fails to designate as the particular climate in this country or others, or the precise location which, from its altitude, geographical position and average temperature reports, would seem to be best for the individual. No specific direction can be given, even when a knowledge of the local catarrhal condition is beyond doubt, when our efforts to relieve or cure the condition by change to other climates, are followed by results, which should not follow from statistical reports furnished. We may advise that the patient seek in Tennessee, North Carolina, Georgia, Florida, or any of our southern states of the east, or California in the west, or in those intermediate climates of Arizona, New Mexico, or Colorado, which may furnish that particular climate, with its proper altitude, lessened humidity of atmosphere and less marked changes of temperature, which we hoped will be beneficial to him and prove remedial to the individual's catarrhal condition. The altitude and the greater dryness of the atmosphere, due to geographical location, the improvement of

the hygienic surroundings, which latter may after all be the most beneficial in retarding, limiting, or curing this progressive disease of the middle ear, make us often question the value of the climato-therapy.

Adenoid growths, and the pharyngeal tonsil, when much enlarged, may require removal. It should be remembered, however, that these adenoid bodies and the enlarged tonsil tend toward disappearance before puberty, so that, except when they are a recognized aggravation of the aural trouble, from direct pressure upon the eustachian tubes, it is better to avoid surgical interference, as the attempt to remove them is often followed by an acute inflammation of the middle ear, with the result of destroying the hearing or aggravating the aural trouble.

The turbinate bodies often present a turgescence, which interferes with the respiration. They are not always the cause of the mouth-breathing which may be present, and while their swollen condition, due to their tumidity, may impede the child's breathing, it is not always necessary to remove them in whole or in part by thermo or electro-cautery, or caustic measures, or in any other manner, as their enlargement is often only temporary and we should consider the need which, both as child and adult, it may have in the future for the membrane which may be thus destroyed. Time will probably develop the fact that the destruction of these membranes and other contiguous portions have much to do with the individual's future systemic economy. When we consider that a pint and a half of serum is secreted every twenty-four hours by the mucous membrane lining the nose and throat, for the purpose of filtering, moistening and warming the air we breathe, it is a question whether these tissues, which nature has provided for the proper protection and sanitation of the lungs, should not be retained as they may be in many cases, or removed or destroyed in the immediate effort which may seem necessary for the temporary relief which perhaps accompanies such measures. Already from my observation, cases present conditions as a result of surgical interference in this direction which, while it has benefited the child at the time, has deprived it of a protection against disease, when better results might have been attained by a purely medical treatment.

Where the hearing becomes so impaired from any cause that the child no longer hears the tones of the human voice, if it is under five years of age its power of speech is also lost, hence, in the effort to prevent deaf-mutism, it becomes necessary to apply the treatment as early as possible. In these cases, while they are undergoing the treatment for the aural catarrh, they should be compelled to keep on talking and not be allowed to

resort to the sign language. If the ear trouble can be even partly cured, there is a very fair chance of their retaining their speech under these circumstances.

In the treatment of chronic aural catarrh, it is imperative that the eustachian tubes and the tympanic cavity should be thoroughly inflated with air after the method of Politzer. The ordinary air-bag is moderately compressed by the hand, after the nose-piece of the bag has been placed in one side of the nose and the other side closed by the finger. As a rule the inflation is accomplished in the majority of cases with little difficulty; the operation clears the cavity of the middle ear of serum or mucus, replaces the drum-head in position, and is often followed by a marked improvement in hearing, which, however, is as often lost before the succeeding treatment brings with it another inflation. As the condition of the ear improves, the effect of the inflation is more lasting, and finally in cases which are cured becomes permanent.

The action of the homeopathic remedy in this disease is prompt and at times marvelous in cases when the true remedy is prescribed. The remedies which are more frequently indicated are: arsenicum; argentum nit.; aurum mur.; belladonna, calcarea carb.; calcarea phos.; causticum; ferrum phos.; graphitis; hepar sulph.; kali mur.; kali phos.; mercurius dulc.; phosphorus, etc.

The special indications will be found in the general list of aural remedies given on page 97.

INTERNAL EAR.—The internal ear, or labyrinth, in which is lodged the delicate mechanism that terminates the nerve of hearing, is situated just beyond the middle ear, and in adult life well protected by the solidification which comes with the full development of the temporal bone. It is readily affected by diseases and injuries of the middle ear, and also of the brain, with both of which it is intimately connected during child life. The temporal bone, not having reached that growth and compactness which comes in later years, does not afford that protection from both disease and injury which is reached later; hence the internal ear is more susceptible to diseases which destroy its function in early life than in the adult.

The concussion of the head from blows or falls, readily communicates its effect to the labyrinth and the hearing is thus often destroyed. Such diseases as cerebro-spinal meningitis, mumps, hemorrhagic inflammation of the internal ear, and inflammatory extensions from the middle ear to the labyrinth in scarlet and typhoid fevers, and acute or chronic suppurations of the middle ear, furnish a large number of internal ear dis-

eases which, from their invasion of the labyrinth, destroy the hearing and produce in the younger children deaf-mutism.

The destruction of the essential portions of the internal ear are not rare to the aurist, although much less so to the general practitioner. Of the causes which occasion it, twenty-five per cent. are those of meningitis and cerebro-spinal meningitis, while scarlet fever presents the next most frequent cause. These diseases produce internal ear inflammations by direct extension from the brain or middle ear. But such diseases as small-pox and parotiditis in children, also produce internal ear complications which cause destruction of the auditory nerve or of its function. Imperfect development of the internal ear due to pre-natal causes, frequently exhibit, on post-mortem examination, sufficient cause of the infant's deafness.

The symptoms which may indicate an affection of the internal ear in infancy or early childhood, are so often similar to those arising from affections of the contiguous parts, that it is difficult to differentiate between the symptoms which arise from an acute inflammation of the middle ear and that of the internal ear, as one may exist alone or complicate the other, and during their inflammatory stage simulate those symptoms which are presented in affections of the meninges or the brain.

In children too young to express the location of their suffering by words, we may thus be often in doubt as to the organ which is diseased. The cry of the infant, which is always a symptom of discomfort, if not of disease, should require attention, that its comfort may be assured and the possible disease be averted. When the symptoms of affections of more remote organs have, as the possible cause of the child's pain, been eliminated, the diagnosis of the probable ear or brain affection becomes a necessary consideration.

One often finds as much difficulty in distinguishing the "cri cephalique" of meningitis from the "cri" occasioned by acute middle and internal ear disease, as he does in determining the value of those symptoms which indicate a capillary bronchitis or pneumonia in infancy when their possible cause is due to a reflex of middle or internal-ear inflammation, until an examination of the ear is made, or when a punctured or ruptured drum-head gives relief to the sufferings of the child and causes a change of opinion as to the diagnosis and prognosis. In the infant, as we are dependent upon the objective symptoms for our diagnosis and prognosis, the close study of the symptoms presented enhance both their diagnostic and prognostic value. When in the absence of marked increase of temperature and no special variation in the digestion or the action of the

bowels the infant rolls its head from side to side and in its restlessness cries out in that tone which has been designated the "head-cry," or when the movement of the head by the attendant gives evident pain to the child, it is probable that an implication of the ear may be the cause of its suffering rather than an affection of its brain or other portions of its anatomy. The loud and passionate cry of the infant, together with the aggravation from movements of the head and the temporary relief afforded by resting the head upon one side or the other, may give a clue to the real affection. For example, a child is attacked with a sudden fit of vomiting, which recurs at intervals during the several succeeding days and presents a temperature somewhat above the normal with more or less marked chill. Within the first twenty-four hours of the attack no difficulty in hearing is noticed, but the following day brings with it a deafness which is complete. The child's brain remains clear, and no convulsions, paralysis or opisthotonos are present. In a week the child recovers its appetite and indulges in play, but it is noticed that there is complete deafness and that there is also an unsteadiness of its gait, and it requires often to be led to prevent frequent falls. We examine the auditory meatus and the drum-head, and find no variations from their normal condition sufficient to account for the symptoms presented. The close study of the symptoms, however, are followed by a diagnosis of inflammation of the labyrinth. We must differentiate between this affection of the internal ear, which might be termed idiopathic and that which results from hemorrhagic inflammation, which is not uncommon during the infantile period, and those arising from such inflammatory extensions as follow cerebro-spinal meningitis, injuries and complications arising from diseases of the middle ear alone, or accompanied by those diseases which affect the general economy of the child as well, largely by the history as well as the symptoms presented by the disease. Such drugs as quinia, salicylic acid, salicylate of soda, salol and some of the coal-tar products which have come into such prominent favor, have, when administered in individual cases, produced permanent middle and internal-ear changes, which have been followed by loss of hearing and deaf-dumbness as well.

The destruction of the auditory nerve or its function from any cause in children under the age of seven years means to the child, if it lives, not only the loss of audition but also that of whatever power of expression of speech it may have acquired prior to its deafness. Unless early attention is called to it and educational treatment followed, the possible

retention of the vocal expression it may have had, or the acquirement of the power of speech in the absence of audition, is frequently lost.

While treatment of the ear, both local and internal, may be followed with some gain in the hearing in these cases, the results are usually only those which, by the slight improvement gained, aid the child in its proper education as a deaf mute.

It is necessary, then, when medical or surgical relief cannot restore the child's hearing, to advise such measures as may enable the child, by proper education, in its forlorn condition, to acquire by intelligent training, the power of speech in the absence of its hearing.

We have now in all large cities, homes and schools which are designed to meet the necessity for the physical, moral and intellectual training of those children who are both deaf and dumb. The good results obtained from this educational treatment of the diseased conditions, which cause complete deafness in childhood, seem wonderful to even those who have given the matter thought. The instructions afforded in these institutions, which enable the child to gain or acquire the power of speech, from the expression and motion of the lips or the mechanical vibration of the larynx of the teacher when felt by the child, is such as to give to those deaf mutes, which have good intelligence and normal vocal organs, the power of conversing in any language which has thus been taught, and often present a general knowledge and education which seems incomprehensible to those who hear.

Much may be accomplished by treatment, in the way of the absorption of inflammatory deposits in the internal ear, or the dissipation of the effects of the disease which has destroyed its functions by such homeopathic remedies as hepar sulph., silicea, calc. carb., ferrum phos., and the employment of like remedies, strychnia, gelsemium, and the salicylates, which may have a revivifying and stimulating effect upon the auditory nerve. Such adjuncts as electricity, and other local measures which may improve the condition of the middle ear or its throat portion, are to be considered.

When a child has lost its articulation as a result of disease of the internal or middle ear, we should direct the attention of the parents or guardian of the child to the necessity for that educational treatment of the child, which may enable it to acquire a knowledge and education not otherwise attainable, and which may give it the ability to hold a position in the community in which it resides, oftentimes higher than that of some others with normal hearing and less intellectual development.

The education of the deaf and dumb child should be begun

as soon as possible after its deafness has been determined. Every effort should be made to have it learn to articulate and discourage its effort to communicate by signs.

When a child appears stupid, inattentive, or does not keep pace with its associates in the intellectual race at kindergarten or school, humanity demands an investigation of the ears, as well as the eyes of the child, by a competent medical adviser, who may find that the fault is not in lack of cerebral development, but loss of audition. The hearing power of the teacher is frequently less than it should be, and what appears to be only the fault of the child, may be due to impaired hearing upon the part of both the tutor and child, or want of judgment upon the part of the teacher when the child's hearing is impaired. The child at school with imperfect sight or hearing, too often seems to have assigned to it the desk most remote from the blackboard, or the teacher's platform. The teachers of to-day, however, recognize the fact, that they themselves may also have faulty eyes and ears; and when cognizant of such defects, are more charitable to the children under their educational supervision. When complete deafness is present, its recognition is usually easy for the teacher; but when only partial, the child suffers from non-appreciation of its defective hearing, is placed at the foot of the class, and reprimanded for inattention, or said to be stupid. To one who is brought by his professional relation in close contact with these children, who are too often the innocent sufferers of both mental and physical punishment, because of their defective hearing, it seems an earlier consideration of the possible defect should be given in all cases, where other causes which may occasion them are absent, and an examination by an aural expert be advised.

AURAL REMEDIES.—The homeopathic indications of the most common aural remedies are grouped together here, and have been taken from Prof. H. C. Houghton's work on Clinical Otology, as they present the most valuable summary extant.

Aconitum.—In acute suppuration of the middle ear, or for acute symptoms arising in chronic cases.

Aurum Met.—Is indicated in suppurative inflammation of the middle ear when the periosteum of the temporal bone is affected. The subjective symptoms, so far as the ear is concerned, are decidedly negative; but the general ones make the choice between this remedy and fluoric acid, nitric acid, or silicea, easy.

Baryta Muriatica.—Baryta is one of our most valuable remedies, both in suppurative and non-suppurative inflammation of the middle ear. Hardness of hearing, severe buzzing in the

ears, crackling in both ears when swallowing, a reverberation in the ear on blowing the nose.

Belladonna.—In acute inflammation of the middle ear, or when acute symptoms arise in chronic disease.

Calcarea Carbonica applies to the same class of patients as in general diseases — the fat, rapidly growing, large-headed, soft-boned children, or adults who in youth were vigorous, but now fail from low power of assimilation; great weakness, sensitive to cold, damp air. The pains about the head are pressing or pulsating, often semi-lateral; coldness or perspiration of the head; detonation in the ears; meatus filled with whitish, fetid pus or viscid discharge.

Capsicum.—For chronic suppuration. The pains in and around the ear are acute, shooting, pressing, with bursting headache. On the mastoid, behind the ear, a swelling painful to touch.

Elaps Corallinus.—Indicated in the chronic suppurative form of disease, complicated with naso-pharyngeal catarrh; the posterior wall of the pharynx covered with crusts; external meatus full of offensive yellowish-green discharge, which stains the linen green; membrana tympani usually perforated.

Ferrum Phos.—Schussler claims that this salt controls the beginning of disease. "Whilst iron restores to their normal condition the blood-vessels, enlarged by disease, it heals the irritative hyperemia, which is the cause of the first stage of all inflammations." This remedy has been called "tissue aconite." One characteristic may guide to its use—beating in the ear and head; the pulse can be counted in the ear, one patient remarked.

Gelsemium.—While this remedy may be more frequently needed in acute disease of the middle ear, it may be specially effective in mastoid disease, or acute necrosis, complicating acute suppuration.

Graphites.—The relation of this remedy to the nutrition of the skin holds good in dry conditions of the mucous membrane; indeed, we may infer very much of the condition of the tympanum from study of the dermoid layer of the external auditory canal. Hence, the condition is that of sclerosis or proliferous inflammation. The membrana tympani may be opaque and thick, or transparent and very thin, adherent to ossicula or promontory, or perhaps mobile; eustachian tube dilatable, but hearing not improved by inflation. There is one subjective symptom which is characteristic—"hearing improved in a noise."

Hepar Sulphuris Calcarea.—In the suppurative form; membrana tympani perforated; ulceration angry; discharge small

in amount, sour, and of fetid odor; the tissue very sensitive, often covered with white shreds, which cling to the ulcer. Subjective symptoms: soreness in small spots about the ear; itching; patient worse at night and by cold air.

Hydrastis Canadensis stands first among remedies for muco-purulent discharge from the middle ear. In purulent inflammation of the middle ear, with thick, tenacious discharge, more mucus than pus, this remedy is invaluable.

Iodine.—In chronic, non-suppurative disease. Curative in atrophy of mucous membrane, probably by stimulating glandular elements of structure.

Kali Bichromicum.—In chronic suppuration; membrana tympani perforated; the cicatrization of the edges of the perforation complete; the tissues have an appearance as if changed to mucous membrane, and the secretion is often more mucus than pus; the discharge yellow, thick, tenacious, so that it may be drawn through the perforation in strings. The subjective symptoms are lancinations, sticking sensations, that the patients are not able to locate with any degree of positiveness.

Kali Muriaticum.—One of the most effective remedies we have ever used for chronic catarrhal inflammation of the middle ear, specially of the form designated "proliferous." Subjective symptoms, a stuffy sensation in the recent cases, subjective sounds, and deafness are very marked. The objective symptoms are, the naso-pharyngeal tonsil, closed eustachian tube, retracted membrana tympani and atrophied walls of the external meatus.

Kali Phosphoricum.—For suppurative disease, specially chronic form, Schussler says: "Potassium phosphate cures the following diseased conditions: septic, scorbutic bleedings, mortifications, encephaloid cancer, gangrenous croup, phagedenic chancre, putrid-smelling diarrhea, adynamic typhoid condition, etc." From the foregoing indications, we are led to use it in ulceration of the membrana tympani, with or without perforation, in suppuration of the middle ear, the pus being watery, dirty, brownish, very fetid, the ulceration angry, bleeding easily, and showing little tendency to granulate, or secret laudable pus.

Kali Sulph.—For catarrhal disease or suppuration, if the discharge be muco-purulent rather than purulent. The guiding symptom is the color of the secretion, which is yellow, sticky and tenacious.

Mercurius Dulcis.—In chronic catarrhal inflammation of the middle ear. The objective symptoms are those of this form of inflammation,— membrana tympani retracted, thickened and

immovable by inflation; a granular or hypertrophied condition of the pharyngeal mucous membrane. The subjective ones are those of a benumbed, dull feeling between the throat and ear, a pressure in the ear from without.

Mercurius Solubilis.—Otitis following exanthemata, and in scrofulous and syphilitic patients, pain in ear, extending to face and teeth, worse by the heat of bed; excoriation and ulceration of meatus; sensitive to cold; abundant secretion of cerumen or flow of pus and blood; sweating without relief, occurring from cold, when there are hypertrophied tonsils or diseased parotids; pulsative roaring in the affected part; ulceration of the membrana tympani, which bleeds from the slightest touch; constant cold sensation in the ears.

Phosphorus corresponds to a dry condition of the tympanum. One objective symptom, deafness, is interesting in this respect, that the failure is especially for the human voice; noises and musical tones are recognized much more readily than the modulations of voice.

Psorinum.—A remedy closely allied to sulphur. In chronic suppuration, where the symptoms remain unchanged after sulphur, the ulcers scab over rapidly; the pus very fetid, with the ulceration of the membrana tympani; scabby ulcers on the vertex and behind the ears. Subjective symptoms: excessive itching in the ears, so that children can hardly be kept from picking or boring in the meatus.

Pulsatilla.—For acute catarrhal inflammation, or chronic suppuration, when the discharge is a bland muco-purulent secretion. Fever without thirst, relief of pains in the open air, and a peevish, changeable, timid disposition, indicating the nervous depression, are guiding symptoms.

Silicia.—In chronic suppuration; ulceration in cachectic subjects, or those who have been dosed with mercury; in caries or necrosis. Objective symptoms: membrana tympani perforated and irregular; secretion of pus scanty; ulcers deep, and covered with scabs unless frequently cleansed. More repairs of the membrane occur under the use of this remedy, in chronic diseases, than under any other single remedy.

Sulphur.—The indications for this remedy must be sought in general rather than in special objective ones, as they are meager compared with the last-mentioned remedy as well as others. Itching in the ears, drawing or shooting pains in the ears; discharge of pus, stinking, with crusts.

Tellurium.—Curative in chronic suppuration, when the symptoms correspond to the following: a watery fluid, smelling like fish-pickle, which excoriates the meatus and the skin wherever it flows. After the suppuration has ceased, the

membrane has been found cicatrized and corrugated, but not thickened.

Thuya Oc.—The special indication for this remedy is the discharge "smelling like putrid meat." Clinically it has cured granulations in the meatus similar to condylomata.

DISEASES OF THE EAR IN THEIR RELATION TO THE GENERAL ECONOMY OF THE CHILD.—Affections of the ear as well as those of the eye have a causative value in the production of diseases of other portions of the child's anatomy. While the possible complications which may arise and affect other parts of the child's system have been already mentioned in the discussion of the direct inflammatory affections of the ear, it may be well to recapitulate here the general systemic affections, which may accompany or follow diseases of the ear.

When the infant in its distress, presents objective symptoms of suffering sufficient, in the judgment of its attendant, to call a physician for relief, it may be difficult for him to formulate an opinion at once as to the exact lesion which may be present. It should be considered before a diagnosis or prognosis is made, that while the symptoms may be those of meningitis, cerebro-spinal meningitis, capillary bronchitis, pneumonia, cerebral irritation with convulsions, that an affection of the ear may be the cause of the symptoms which may lead to an erroneous diagnosis.

Foreign bodies in the ear may occasion, by irritation of the walls of the canal, a reflex through the third branch of the fifth and pneumogastric nerves, which may result in development of what appears to be true epileptoid convulsions, or, perhaps, even a paralysis, or paresis of parts of the same side of the body as that of the ear which contains the foreign substance. It should also be mentioned that similar foreign bodies may remain in the auditory canal for an indefinite period, without exciting any such reflex disturbances in another child, owing to a less abnormal development of the nerves supplying the auditory meatus, or the absence of a hyper-sensitive condition of the child's nervous system.

There is a form of epilepsy which has its origin in otitis media, usually of the chronic suppurative type, where the attacks are excited by inflammatory thickening, or from irritation of the middle or internal ear, resulting from pressure due to inflammation or from nerve irritation arising during the destruction of the parts. It is more frequently found associated with caries and necrosis of the internal ear, and of the temporal bone. The mastoid, when diseased, also holds a causative relation occasionally. In all cases of epilepsy, where there is a history of

aural disease, or where aural symptoms are present, it is well to examine into the condition of the ear.

Where there is a more or less constant discharge from one or both ears of the child, which from neglect, or want of proper treatment, or even when the best available treatment has not caused its cessation, the child then exists with a condition which menaces its life at all times, and which may at any time on the accession of an increased inflammation due to cold, or the extension of the ulcerative inflammation of the mucous membrane, and periosteum of the middle ear, result in dangerous or fatal complications, such as meningitis of the base of the brain of the infant; that of the convexity in older children, abscess of the brain, phlebitis, thrombosis of the sinuses, paralysis of the face, hemiplegia, mastoid inflammation, caries and necrosis of the temporal bones, epilepsy, chorea, stupidity, idiocy, persistent cough, nausea, or vomiting, or death.

Should the pedologist doubt, from the list presented of diseases of the ear, with their possible complications, or fatal culmination, which are by the aurist to be considered as possible causes before a diagnosis in obscure cases is given, even where no ear affection has been noticed or considered likely to have any bearing upon the condition presented, he will find their importance unquestioned, after the observation and experience which comes from an extended aural practice.

General Diseases of the Child in Their Effect upon the Ears.—In the discussion of the various diseases of the ear, those which produce more directly an involvement of the organ of hearing, such as dentition, the exanthemata, diphtheria, typhoid fever, pneumonia, bronchitis, catarrhal conditions, and other diseases of the nose and pharynx, have already been partly considered, and as they bear by far the greater causative relation to ear diseases, they demand still further attention. The fact should be noted that affections of the auricle and the external auditory canal result from eczema, or other affections of the skin of the head or face, by an extension of the disease through continuity.

In all cases where an ear affection is noticed, the careful consideration of the general condition of the infant or child is of the utmost importance in the effort to cure the local affection.

Cerebro-Anemia or Hyperemia may produce more or less giddiness, or even marked vertigo, due to circulatory disturbances in the labyrinth with or without impairment of hearing, and is usually associated with disturbance or loss of vision from the same cause. When hyperemia is present there is

usually vertigo, with the complaint in older children of noises in the ear, with or without visual destructions. Anemic conditions more often cause transient loss of hearing with faintness.

Tumors of the Brain, and hydrocephalus, while more common causes of eye changes and loss of vision, produce deafness by affecting the integrity of the tissues of the internal ear. A descending neuritis of the auditory nerve or serous inflammation and destruction in cerebro-spinal meningitis, particularly of the epidemic form, while frequently affecting both the eyes and ears is more likely to impress the ear early in the attack, usually during the first few days, and the serous or suppurative inflammation set up in the internal ear is followed by a more or less complete deafness. Cerebro-spinal fever, in conjunction with meningitis, the latter taking the lesser prominence, are the most frequent causes of destruction of the function of the internal ear, and present the most common cause of deaf-mutism as shown by the census reports. The destruction of the nerve which is exhibited in those cases is due to an extension of the inflammation from the brain.

Meningitis, next to cerebro-spinal meningitis is the most frequent cause of destruction of the hearing function in infancy and childhood, and the loss may be due to the complication of both middle and internal ears.

Nephritis in childhood is rarely cause of an aural affection, except when the nephritic condition is the cause of lowered vitality, then a circumscribed inflammation of the external auditory canal may occur, as in the "cat boils" or small abscesses of the canal, which appear at any age as the result of malnutrition and are often indications of the general condition.

Typhoid Fever, bronchitis and pneumonia should be borne in mind as causes of aural complications which are not uncommon and that deafness, or insomnia, or coma may arise from ear complications. In the grippe influenzas of the last three years the ears have suffered more often from mastoid complications than in the common influenzas, which are too often the cause of uncomplicated otitis media. During childhood, which in our climate is usually limited to the first fourteen or fifteen years of life, typhoid fever presents affections of the middle ear due mainly to the extension by continuity in cases where the catarrhal symptoms are prominent. The mucous membrane of the pharynx and naso-pharynx being commonly subject to inflammations in all fevers, whether typhoid, typhus, remittent or other fevers, the possible ear complications in all febrile conditions are to be thought of. While in a general

sense the cases may not be common to the general practitioner, the aurist has in his practice to examine, treat and relieve many cases of deafness which are complications of these diseases.

Intestinal Diseases.—Affections of the alimentary tract have little connection in a causative way with aural diseases, except in as far as they affect the nutrition of the tissues of the ear, and by aggravating a pre-existing naso-pharyngeal condition of catarrh cause a middle-ear catarrh, acute or chronic, or a suppurative inflammation with all its possible results, which involve the hearing and life of the child.

Dentition.—During the eruption of the teeth the infant often suffers from congestion of the auditory canal and of the drum cavity or the eustachian tube, which is accompanied by severe pain in the ear, the cause of the crying of the child being referred to the swollen gums which are less rarely the seat of, although the indirect cause of, the pain. The relief obtained in such cases from the application of dry heat to the ear enables us to determine the fact that an ear complication due to dental irritation is present. When the irritation is prolonged, a slight discharge of pinkish serum from the engorged blood-vessels appears upon the pillow, or in more severe cases, the external auditory canal fills with pus or muco-pus from middle-ear suppuration upon the rupture of the drum-head. In all cases attention should be directed to the gums, and relief obtained by lancing them whenever it may be deemed advisable.

Syphilis.—In infancy, childhood and adult life the affections of the ear from primary syphilis are extremely rare; an occasional case of chancre of the auricle has been reported. In the infant the syphilitic infection of it may have been pre-natal and the expression of the disease upon the ears that of the tertiary stage.

During childhood a sudden and complete deafness may occur as the result of the inherited dyscrasia, which affects the internal ear, or in other cases the hearing be slowly lost, owing to more gradual disease changes in the middle or internal ear.

Scarlatina.—Of the exanthemata none cause such frequent implication of the middle ear with destructive suppuration, acute and chronic, loss of hearing and all the complications and sequela which may result, than scarlet fever. Next to meningitis and cerebro-spinal meningitis, this disease furnishes the largest number of cases of deaf mutes; according to the last census report 25 per cent. were caused by scarlet fever.

Rubeola.—Measles immediately follow scarlatina in order of frequency as a cause of aural destruction. The implication of

the throat and naso-pharnyx in both these exanthems, make the extension of the disease to the ear very easy, and the inflammation thus produced is followed by destruction of the essential portions of the hearing apparatus, and leaves conditions of chronic ulceration, adhesions in the chain of ossicles, and progressive deafness.

Diphtheria.—Statistics show that diphtheria is a frequent cause of deafness, and the direct cause in cases when it is associated with scarlet fever or when the membrane invades the upper pharynx. The malignancy of the disease is such that when the child becomes deaf from the invasion of the middle ear, if it survives the diphtheritic attack, it is likely to become permanently deaf, owing to the destruction in the ear and the subsequent changes in it which follow.

Variola.—In small-pox, the impression made upon the ear is less marked than that upon the eye, as the pustules are rarely if ever found in the ear. Occasionally there is during the course of the disease, a middle-ear suppuration, which, however, should not be considered the result of direct infection.

Pertussis.—Whooping cough not infrequently produces ear complications, as hemorrhages in the drum cavity, or rupture of the drum-head which may occur during prolonged paroxysms of cough. A middle-ear catarrh or suppuration is not uncommon, either during the attack or following it.

Parotiditis.—Mumps rarely cause an implication of the ear during the stage of swelling of the gland, but often after the attack has passed, inflammations of the middle ear may follow. The internal ear may also suffer loss of function as a result of the metastasis of the disease.

Typhoid Fever.—The mucous membrane of the nose and throat are commonly subject to inflammation during typhoid, typhus, remittent or other fevers; for this reason middle-ear complications are frequently presented. Occasionally one or both labyrinths are affected by cell infiltration during the course of the fever which may result in temporary or permanent deafness.

Diseases of the Heart are scarcely ever known to produce any direct effect upon the ears of children.

Diseases of the Central Nervous System cause loss of hearing more or less complete from affections of the internal ear. In the brain, changes in the cortex present such unique phenomenon as deafness for certain words, or "word deafness."

Diseases of the Sexual System.—Those changes in the general system occurring at puberty, as a rule produce less affection of the auditory than those of the visual organs. It is rarely that we find at puberty an appreciable effect of the change in the

sexual system upon the ear; even when noticed, usually causing only an aggravation of a tendency to ear disease which had previously existed.

INJURIES OF THE EAR.—The auricle and outer portion of the canal are rarely the seat of direct injury, except those which result from the attempts to remove foreign bodies from the ear. At times an insect may find its way into the infant's ear while sleeping upon the ground, or even in its crib. The diagnosis of the cause of the infant's discomfort cannot always be readily arrived at, but in the absence of other affections which account for it, a glance into its ear may reveal the presence of an insect; then a few drops of water, oil, or any bland fluid instilled into the ear, will at once quiet the child by drowning the insect, which soon appears in the fluid at the outer portion of the canal.

Occasionally we are called upon to treat a punctured wound which follows the introduction of some sharp-pointed stick or instrument.

In infancy, owing to the more horizontal position of the drum-head, it escapes injury unless much force is exerted. Injuries of the deeper portion of the ear are apt to be followed by meningeal inflammation arising from the trauma.

During childhood, foreign bodies of all kinds are frequently put into the ear by the child or its playmates. The size is always less than the caliber of the meatus and this fact should always be kept in mind. The child never pushes it so far in that with intelligent care, it cannot be readily removed; in the majority of cases, when foreign substances are in the canals, changing the position of the head, by placing the child on a table with the head extending beyond it and the ear containing the foreign body directed towards the floor, a slight pulling downward of the ear, thus straightening the canal, results in the falling of the body by the force of gravity to the floor. If this fails, then no effort should be made to remove it, without first having ascertained its exact nature and position under a full illumination. Even then it is better to use the syringe and water than to attempt its instrumental removal except in the most skillful hands. In the majority of cases, where foreign bodies have been placed in the ear, the danger is always greater of injury to the ear from the misguided efforts at its removal than from the foreign body itself. Ordinarily, an object put in the ear, unless pressing upon the drum-head, which occurrence is very rare, except as the result of an attempt to remove it, may remain there for years without other disturbance than a partial or complete loss of the hearing in the stopped ear.

Pebble-stones, seeds of all kinds, sufficiently small to pass into the canal, deciduous teeth, shoe-buttons, cork, pieces of cloth, wads of cotton, and various other substances have, in the writer's experience, been removed from the ears, after having remained there for weeks, months and many years without occasioning any disturbance except that of defective hearing. It has been the good fortune of the aurist to relieve what has appeared to be serious neuroses; but when, in the absence of a satisfactory explanation, their cause has led to the examination of the ear where deafness of one ear had been noticed and the removal of a foreign substance, which, pressing upon the walls of the canal occasioned the reflex symptoms, removed all difficulty.

Tumors of the ear or malignant disease are so rare in childhood that they need no discussion here.

PART III.

DISEASES OF THE DIGESTIVE ORGANS.

CHAPTER I.

GENERAL CONSIDERATIONS.

DISEASES of the digestive apparatus are exceedingly common in infancy and childhood, and only the greatest care in the management of the food, the clothing and the hygiene of the nursery can avoid them. Even under the most favorable circumstances and when every care has been exercised, vicissitudes of climate, atmospheric changes, impurities in food which have eluded all vigilance and other factors which the greatest foresight cannot eradicate, render disturbances of this part of the organism among the most frequent that the physician has to deal with. Whoever has read the preceding pages must have recognized the difficulties encountered by one endeavoring to meet the nutritive wants of a young infant, whose powers of assimilation are at best but feeble and who may possess peculiarities or idiosyncracies which experiment and repeated trials alone can render intelligible. The diseases and disturbances of function which we are about to consider are usually readily recognized and generally at their beginning easily remedied by intelligent treatment. They cannot, however, be neglected; for, trivial as they may seem in their incipiency, they are liable to become chronic and obstinate or even fatal. A timely recognition of the malady, a true understanding of its pathology, and a judicious selection of remedies are imperative.

It will be found, especially in hand-fed infants, that a change of diet is frequently an essential part of the treatment. In cases where vomiting or diarrhea is a prominent symptom, it will be advisable for a day or two to suspend cow's milk either partly or wholly, and to substitute cream therefor. In obstinate cases of this kind, in which the milk is thrown up curdled, or passed undigested in the stools, raw-meat juice, spoken of in another chapter, or bread jelly should not be forgotten. The

gelatin food of Dr. Meigs is another food that meets the special wants of some of these cases.

Oftentimes a slight change in the customary aliment is sufficient to set matters to rights; but often, again, the physician will be sorely puzzled to find the exact food that will fit the case. Nothing but watchful and persistent care will insure success, and in the matter of remedies the closest study of both symptoms and drugs will be necessary.

It should be clearly borne in mind that vomiting in infancy does not always have the significance that it carries with it in adult life. Indeed, vomiting or regurgitation of food in infancy may be simply due to too frequent nursing or overfeeding and may have no pathological significance whatever. It occurs without nausea and without effort. The size of the stomach, as we have already pointed out in our introductory chapter, is relatively small—holding at the age of two months only about four ounces, and at twelve months about ten ounces—and if this capacity for food be exceeded, as it often is by a healthy, vigorous child, the vomiting is simply the overflow which is over and above the stomach's needs. The position of the stomach, moreover, is nearly vertical and the absence of the gastric fundus makes vomiting under these circumstances a matter of great ease. The milk thus ejected is unchanged, or if it has been retained for some moments the casein may be somewhat coagulated. In either event there is little harm from its being thrown up; in fact, it is a salutary phenomenon, for this excess of food, if retained, would undergo fermentation and give rise to irritation either of stomach or bowels.

Vomiting, however, when attended by emaciation or loss of vivacity, or if frequently repeated when there has been no excess of feeding, should always arrest attention and its cause be ascertained. It may be the first symptom of gastric irritation or of incipient meningitis.

STOMATITIS.

There are several varieties of inflammation of the mouth, which are very common among infants and children, the mildest of which is known as,

SIMPLE OR CATARRHAL STOMATITIS. — This form is most commonly met with in hand-fed babies, before the completion of first dentition, and indeed is most frequent under the age of one year, and hence is often described by the laity as "nursing sore mouth." It may sometimes be found in infants at the breast, who are, to all appearances, in otherwise good health.

More often, however, it will be found that the inflammation of the mouth is but the visible symptom of a derangement that extends to the stomach, if it does not originate there. It is frequently encountered in the course of any of the constitutional diseases, and usually accompanies or follows the eruptive fevers, and is a part of them. Anything which lowers the tone of health may lead up to it, while teething is a very common cause. In these cases, the gum over the advancing tooth first becomes inflamed, and from this as a starting-point the inflammation may extend over a portion or the whole of the buccal surface. When due to teething, the inflammation is, as a rule, partial rather than general.

Symptoms.—Inflammation of the mouth, from whatever cause, is indicated by increased redness, and more or less thickening of the mucous membrane, and by increased functional activity of the mucous follicles. There is more or less augmentation of the heat of the mouth, and pain is experienced when the inflamed parts are touched. In some cases the gums become swollen and spongy, and bleed easily if rubbed or pressed upon. The soreness in these cases is the most prominent symptom and is sometimes so great as to materially interfere with suction.

The tongue is generally coated with a light fur and the salivary secretion is more or less increased—sometimes so much so as to cause dribbling from the mouth. Bleeding from the gums is not uncommon in these cases; but except in poor and neglected families is rarely allowed to reach such a stage. The infant is restless and fretful, and apt to cry whenever it attempts to nurse, from the pain experienced in closing on the nipple. There is little or no general fever; and, except in cachectic infants, or those suffering from some grave co-existing disease, is not at all of a serious nature. It usually yields readily to the simplest treatment; but in some instances, if neglected, it may terminate in one of the more severe forms, such as the ulcerous or aphthous.

Treatment.—The first duty of the physician is to ascertain, if possible, the cause of the stomatitis and to remove or correct it. Bathing the mouth with a soft linen rag wet in cold water should often be resorted to, as it cools the mouth and constringes the relaxed and swollen tissues. If the gums are swollen from teething, it is quite proper to lance or scarify them, as directed in the chapter on teething. Borax is a very useful local remedy, either with honey; or glycerine and water in the proportions of one part borax to three of honey; or a drachm of borax to an ounce of glycerine and water. A weak solution of alum is also useful. One of these preparations frequently applied, with greater attention to washing the mouth and gums

after each feeding, is usually all that is necessary. The disease is so slight in this simple form that no remedies internally administered are necessary.

ULCEROUS STOMATITIS.—Sometimes a simple stomatitis, instead of going on to recovery, quickly eventuates in an ulcerous condition of greater or less extent.

This ulcerous condition, however, when present is always grafted on, or succeeds to, the simple form of stomatitis. The ulcers commence as small white or yellow points and consist of plastic exudation under the epithelium. This exudation produces a slight elevation or prominence of the mucous membrane and causes an ulceration of it. The inflammation usually begins upon the gums and extends along and upon the buccal surface. Some of these white points unite and thus enlarge the affected area. This extension is irregular, and in some cases forms large patches of ulceration. There is no uniformity as regards the size or shape of the ulcers. In the folds of the buccal membrane they are apt to be elongated, while in other situations they may be round or oval. As disease progresses, fresh ulcerations appear, until in some cases a good portion of the mucous membrane of the mouth may become involved. It is no unusual thing to find simple inflammation in one portion of the mouth and this ulcerous form in another. If the disease is severe, there is considerable swelling about the margins of the ulcers and the breath is sometimes very fetid. As soon as improvement begins the swelling subsides, the ulcerous surface becomes more clear and presents a granular appearance. After a time the mucous membrane is reproduced, but the new membrane for a considerable period remains of a darker hue than the adjacent surface. Recurrence of attack is very common. Such cases of the disease are rare in private practice, but in hospitals it prevails extensively and apparently in epidemics.

Causes.—Acidity of the stomach is a prime cause in most cases. Personal uncleanliness, poor food, damp and unwholesome apartments—anything, indeed, which reduces the system and produces a cachectic state conduces to its development. It frequently follows the essential fevers and intestinal inflammations, and in the entero-colitis of infants it is apt to form a protracted and obstinate complication. Its prevalence in the wards of a hospital, where several cases occur together or consecutively, has been thought by some to indicate its contagiousness. But its contagious character is by no means established. In private practice it exhibits no such tendency, and it is quite as reasonable to suppose that, in multiple cases,

there is a common exposure to the same malign influences, just as a whole household may be exposed to malaria and be seized with intermittent fever. We have already spoken of dentition as a frequent cause of simple stomatitis, and the ulcerous form is the same thing, carried a step further, viz., to the stage of ulceration.

Symptoms.—The symptoms in ulcerative stomatitis are more severe than in the simple form. There is more fever, more fretfulness, more salivation and increased tenderness of the parts affected. Drinks, unless lukewarm and very bland, are taken only with pain and difficulty. Both heat and cold are intolerable. If the ulceration is on the gums or lips, the infant nurses with reluctance and cries with pain when the attempt is made. It should be stated, however, that this form of the disease is not so common among infants as among children. Occasionally, though rarely, the submaxillary glands are tumefied, hard and tender. The breath is always more or less affected, and in some cases is exceedingly offensive.

Prognosis.—The prognosis is always favorable, unless the patient is in a decidedly cachectic condition, or a serious coexisting disease be present. Under these circumstances it may be protracted. When the ulcers are small and the inflammation of limited extent, the course of the disease is shorter and more easily managed than when the ulcers are large and the inflammation more extensive.

Treatment.—In the ulcerous, as in the simple variety, much relief is experienced by the use of various soothing applications, applied locally. If the child is old enough to use a mouth wash, a very good one is permanganate of potash, one grain to the ounce of water. Another wash is highly recommended, viz.: hydrastis, which may be used, one-half diluted with water. For young infants, who cannot, of course, gargle their mouths, there is no better application than the borax and honey, spoken of in the last section, applied with a camel's-hair pencil over the affected area. This should be done several times daily. As for internal remedies, the fact that calomel, when given to children, produces a disease of the mucous membrane of the mouth that is indistinguishable from ulcerous stomatitis, would naturally lead us to look to this remedy in a mild form, or at least to some preparation of mercury as the true simillimum. Experience has amply borne out the theory, and placed mercury at the head of the list of homeopathic remedies in this affection. We have found the merc. sol. h. 3x eminently satisfactory given in trituration, a powder of perhaps two grains every three hours. This preparation of mercury we have used with prompter effect than any other

preparation of this drug. Some years ago we had a most obstinate and severe case of stomatitis ulcerosa, in our Free Dispensary, that resisted all treatment for several weeks. It occurred in a girl some eight or nine years of age. The mucous lining of the right cheek was honeycombed with ulceration. She was in fair general condition. Her breath was horribly offensive. She had been to other dispensaries previously without benefit. She was given several remedies—mercurius sol. 3x, among others—without the slightest improvement, when it occurred to me, that, as mercurius was so clearly indicated it might be well to try the remedy in a higher attenuation. All other remedies were discarded, as well as all local treatment, and she was given twelve powders of two grains each, merc. sol. 30th, to be taken every four hours. In a week she was greatly improved and the remedy continued. In another week she was discharged cured. Since this case improved so much more rapidly under the higher attenuation of mercury—indeed, she did not improve at all under the low—we have frequently employed this potency of the drug with success.

The following indications will assist in the selection of the remedy for the particular case in hand:

Mercurius.—Extensive ulceration, fetid breath, copious flow of saliva, tumefaction of submaxillary glands, ulcerated surface bleeds.

Arsenicum Alb.—Great exhaustion, slight salivation, co-existing diarrhea of watery and painless character.

Baptisia.—Considerable fever of hectic character; marked general cachexia; great fretfulness and restlessness.

Arum Triph.—Infant refuses drink and cries when it is offered; saliva acrid and excoriates the lips, causing sores on lips, chin and cheek.

Nitric Acid.—Mouth dry and hot; gums swollen, spongy and bleeding. Other symptoms similar to preceding remedy.

FOLLICULAR STOMATITIS—APHTHÆ.—The aphthous form of stomatitis is very different from those forms that have just been described, but its features are so distinct that there is very little likelihood of confusion. Many writers include all forms of inflammation of the mouth under two heads, viz., aphthæ and thrush.

The word "aphthæ" itself is confusing, for it is derived from a Greek word meaning "to inflame." It has come, however, by general consent, to signify a form of stomatitis characterized by small, round ulcers, which run an acute course, and

are so different in cause and character as to be worthy of a distinct name and description.

Causes.—Aphthæ occurs in children between the ages of two and six years, *i. e.*, after the suckling period, and is apparently more often than otherwise due to errors in diet; such, for example, as the too free indulgence in pastry and sweets generally. It may, however, like the other forms of stomatitis, be due to a deranged state of health, such as may be left by scarlet fever, measles, whooping cough or prolonged gastro-enteritis. It is most common in springtime and autumn, when climatic changes are apt to depress the system.

Symptoms.—Aphthæ consists of a number of small, round ulcers, varying in size from a pin's head to a pea, usually well defined and clear cut, of round or oval shape, and are situated most frequently on the lining membrane of the lower lip; but they may be seen in the furrow between the gum and the cheeks, and occasionally on the latter. They are rarely found on either the palate or the gums. They are quite superficial and are white or yellowish-white in color. They are raised above the level of the surrounding tissue and are bordered by a bright or livid ring of inflamed membrane. They have a striking resemblance to a pearl or bead beneath the mucous membrane, through whose transparent wall they have a glistening appearance. As they occupy the site of the muciparous follicles, they give the name of "follicular" stomatitis to this variety. They are especially vesicular in character, and soon after being formed the vesicle ruptures, leaving a shallow ulcer with a yellowish-gray surface, which heals in the course of a few days, while fresh follicles are forming in the near vicinity. While these pearly spots are rarely seen upon the gums themselves, their edges are prone to be inflamed and more or less gingivitis is quite common. These ulcers are exquisitely painful when touched, much more so than the inflamed surface of the other forms of stomatitis. This is a distinctive feature. When the ulcers are situated on the tongue, they are extremely tender and often prevent the child from eating for days together. There is an increased flow of saliva, but not to the extent that occurs in other forms of stomatitis; and there is no offensive odor to the breath. Sometimes two or more ulcers coalesce and make quite an extensive sore, but this is very rare. More often the ulcers are solitary, leaving patches of normal mucous membrane between them. Their isolated character, their extreme tenderness and sharply defined outlines, together with their pearly-gray appearance, are sufficient to distinguish them from any other affection of the mouth.

There is generally an absence of any but the most trifling

symptoms of general disturbance, although in some cases there may be slight fever, furred tongue, thirst and other symptoms of constitutional disturbance. When symptoms of a graver character than those here indicated are present there is some co-existing malady, to which the aphthae is secondary.

Prognosis.—This is always favorable, so far as the aphthæ, independently considered, is concerned. When taken in connection with other and more serious conditions of health, they may have themselves a gravity not otherwise possessed.

Treatment.—In this form of stomatitis the mouth should be washed out often with chlorinated water or listerine. A good wash is composed of carbolic acid or boric acid—three or four grains to the ounce of water.

When the aphthous patches are so tender as to prevent eating, they may be brushed over with a five-per-ct. solution of cocaine before food is taken or a decoction of marshmallow or mucilage of quince. The action of these is stated by Dr. Allchin to be essentially protective to the raw, painful surface, as well as being somewhat astringent.

The remedies for internal use are mainly the same as those heretofore spoken of in the other forms of stomatitis. Mercurius stands at the head of the list. In addition to the remedies already mentioned, consult

Ethusa.—Stools undigested; much crying as if from colic; profuse salivation or its opposite, great dryness of mouth.

Bryonia.—The mouth is usually dry with thirst; lips dry and parched, rough and cracking; child refuses to take the breast, but when once its mouth is moistened, and it is fairly at work, it nurses well.

THRUSH.—(MUGUET; SPRUE; PARASITIC APHTHÆ.)

Character.—This is the form of stomatitis most common in early infancy. It differs radically from the other forms of sore mouth which we have been considering, in cause, nature and gravity. It consists in the growth and development upon the mucous membrane of a peculiar fungus, known formerly as the *oïdium albicaus*, but latterly as *saccharomyces myoderma.*

Etiology.—Just how this fungus or its spores gain an entrance into the mouth of a nursing babe is uncertain, but it is altogether probable that it is through the contact with the mother's nipple. Bacteriologists regard the fungus as identical with that which turns milk sour, but this point is not fully determined. As the disease is far more prevalent among bottle-fed infants than among those nursed at the breast, it is more than likely that the contagium is communicated through the bottle or the

spoon used in feeding. The milk itself may be a source of infection.

A curious feature of the matter is the fact that in a normal condition of the mucous membrane, this fungus will neither grow nor develop. It must have a diseased membrane, or at least one not in a perfectly healthy condition, before it will take root and flourish. The extent to which it does develop may be taken as a fairly accurate index as to the extent to which the nutrition of the mucous surface is perverted. An acid state of the secretions favors its development. It cannot thrive in an alkaline medium. Milk curd remaining in the mouth, even in the smallest particles, speedily turns sour and forms a fitting soil for its propagation. Strictly speaking, thrush is not a special form of stomatitis, but requires a preceding stomatitis for its development. Some derangement of the system, by which nutrition is impaired, and the normal state of the mucous membrane altered, is an essential pre-disposing element.

Symptoms.—Thrush appears in the mouth, first as small, pearly-white patches, closely resembling a bit of milk curd. These white spots or patches are of varying sizes, from a pin's head upward. They are most commonly found on the buccal surface, but occasionally may develop in the pharynx, esophagus, or other portion of the digestive tube. It is quite prone to add itself as a complication of gastritis or entero-colitis. In the latter case it may extend as far as the anus. It does not affect the nares, the larynx or the bronchial tubes. The first stage of the disease, as above indicated, is that of simple inflammation. On this inflammation the point or patch is developed, and is first white and afterward turns faintly yellow. The center of each is more elevated than the margin. They are easily detached by a little force, but are quickly reproduced again. Their highest elevation is not more than a line above the surface. They tend to spread with great rapidity, so that a single point, at first scarcely visible, may extend in three or four days so as to cover the greater portion of the mucous lining of the mouth. From the first there are the usual symptoms accompanying the simple form of stomatitis, such as restlessness, fretfulness, slight fever, and pain when nursing is attempted. There is not the same amount of salivation as in other forms of stomatitis, the mouth being rather dry and hot. There is no fetor of the breath. In severe cases, the intestinal tube is always affected and the infant has thirst, loss of appetite, vomiting and diarrhea. Rapid emaciation follows as a natural consequence; and if the disease is not arrested, a state of dangerous prostration may be speedily reached.

Prognosis.—The duration of thrush varies according to its

intensity, and the favorable or unfavorable condition of the infant. Under favorable conditions it may be cured in three or four days, but under unfavorable conditions it may last for weeks, unless death supervene sooner. When thrush occurs in connection with gastro-enteritis, the mortality is very great; and occurring in the course of any exhausting disease it is an unfavorable omen. As it is most common during the first few weeks of life, when the reactive powers of the system are feeble, the prognosis is correspondingly doubtful. In itself, however, thrush is not a serious malady. Its grave aspect is due to the low state of vitality or the co-existing derangements with which it is associated.

Treatment.—From what has been said regarding the cause and nature of thrush, the first object of treatment should be to correct the acid condition of the mouth which favors the growth and spread of the fungus. This can only be accomplished by the most scrupulous cleanliness, and by repeatedly washing the mouth with some alkaline lotion, such as borax or sulphide of soda. One or the other of these lotions should be used after each meal, and care should be taken to reach every point of the infected mucous membrane. Attention should be given to the general health, and the medication should be adapted to the totality of the symptoms, of which the obvious thrush may be but a minor factor. For this reason, the remedies which we have already named as suitable for other forms of stomatitis, or which might be considered as indicated, were the malady a purely local one, must be abandoned for such drugs as will reach not only the inflamed mucous membrane of the mouth, but extend their influence to the whole digestive tract. In other words, constitutional remedies are called for, to correct the constitutional dyscrasia underlying the local symptoms. Mercurius is one of those deep-acting remedies that will often be found to cover the entire case. Calcarea carb. is another. Besides these consult carto. veg. china. and arsenicum.

GANGRENE OF THE MOUTH.—(CANCRUM ORIS.)

Definition — Frequency. — The term "cancrum oris," by which this disease is sometimes known, is apt to mislead one to suppose it the same as "canker sore mouth," by which term the laity are wont to designate the aphthous form of stomatitis. The latter, as we have seen, is generally a trifling malady and attended with little danger, while the former is among the most fatal of early life. It is fortunately a very rare disease in this country, and even among the poor and densely crowded districts of London, it is met with but rarely.

At the East London Hospital for Children during seven years—from 1881 to 1887 inclusive—out of a total number of six thousand three hundred and sixty-four admissions, there were only five cases, and in the Hospital for Sick Children, Great Ormond St., during thirteen years ending in 1888, with a total admission of nearly thirteen thousand patients, there were but six cases. We have no statistics of the disease in this country, but can state that during the past seventeen years, not a single case has been seen at the Central Free Dispensary in this city (Chicago), and in a private practice extending over nearly thirty years, we have seen but one case. It is usually of secondary origin and consists of a rapidly progressing necrosis of the cheek or gum, which is usually fatal, and is recovered from only with permanent loss of tissue. It seems to be much more common among females than males, and more frequent between the ages of two and five years than subsequently. It is common to the low-lying, damp countries, such as Holland and parts of Sweden, where it is almost endemic. It is not contagious. Some previous disease, which has left the general health in an impaired condition, or some mal-hygienic influence seriously lowering the standard of vitality, is necessary for its production. For some unexplained reason, more than one-half of the recorded cases have followed closely after measles. A few cases have been observed to follow scarlet fever and the other eruptive fevers. Simple or ulcerous stomatitis often precedes it.

Anatomical Characters.—The parts most subject to attack of gangrene are the inside of the cheek, which first becomes inflamed, then thickened and indurated. This induration extends rapidly and the dark hue of gangrene appears, followed soon by sloughing of the portion, the vitality of which is lost. As the disease progresses it does not incline to attack the blood-vessels, but leaves them exposed while it burrows amidst the softer tissues till it reaches and penetrates the skin of the cheek outside. At the same time it extends downward to the deeper-seated structure of the jaw, where it loosens one or more of the teeth. If its progress be not arrested, it attacks the periosteum of the maxillary bone, destroying the gum and teeth and denuding the alveoli. Wherever it reaches, the tissues are irreparably destroyed.

Symptoms.—The first symptom to be observed is in the mouth, where a point of inflammation presents all the visible signs of simple stomatitis. Very soon, however, there ensues a thickening of the surrounding tissue. The mucous membrane presents a dark-red appearance for the distance of a few lines beyond the point of gangrene, which point marks the seat of

the initial lesion. This dark-red portion covers tissues which are inflamed and indurated and about to become gangrenous. As the disease approaches the surface of the cheek, a livid circular spot is noticeable on the skin corresponding to the already necrosed portion of the mucous membrane within the mouth. The tongue is usually swollen, but moist; there is little or no fever, and the indications of suffering are not at all in proportion to the gravity of the disease which is in progress. As gangrene is rarely, if ever, a primary affection, its symptoms are not easily separated from the general pathological state which accompanies it. There is progressive prostration as the disease advances. The body and limbs emaciate and the eyes are hollow and the lids edematous. Sometimes the child is fretful, at others dull and indifferent. The pain is never as great as in some forms of stomatitis, which are devoid of danger. If the cheek is perforated, it interferes with alimentation to such a degree that the appearance of the child becomes pitiable. The saliva flows from the mouth either pure or mixed with blood and offensive matter.

Except in very mild cases, there is a distinctively gangrenous odor. There is usually great thirst, and the appetite, though sometimes poor, is often good throughout the entire course of the disease. There is no vomiting, nor are the bowels affected.

Prognosis.—The majority of children affected with noma die, either from exhaustion or from fatal hemorrhage, which results from the destruction of continuity in one of the blood-vessels. In many cases, however, which reach a fatal termination, there is no hemorrhage, in consequence of coagulation in the vessels. The prognosis is materially affected by the amount and nature of the cachexia associated with it. If it occurs as a sequel to a disease which has materially sapped the vigor of the patient, and co-existing symptoms indicate a serious condition of malnutrition, the outlook is obviously poor; but if the general health is in a fair condition and assimilation is not hopelessly impaired, there may be a chance to arrest the gangrene before it has reached a necessarily fatal stage. If the disease has involved the maxillary bone, recovery takes place with the permanent loss of teeth, and the patient may lose the free use of the jaw. The separation of necrosed bone in such cases is slow and tedious.

Treatment.—As gangrene of the mouth is pre-eminently a disease of debility, the most obvious necessity of treatment is to bring about, if possible, the most rapid restoration of the general health. All anti-hygienic influences must be removed, and the most nourishing food given. Old-school writers recommend ferruginous preparations and the bitter tonics, such as

quinia, quassia, etc. Cod-liver oil is also recommended. The nature of the disease is such, that a prompt arrest of the destructive process is most desirable, and for this purpose, some escharotic is a necessity. M. Taupin advises, after removing a considerable portion of the gangrenous tissues with scissors, the application of strong muriatic acid, and when the slough is detached, of dry chloride of lime.

Dr. Coates, in the Children's Asylum, uses the following formula, which is indorsed by others who have used it:

℞ Cupri sulph..... ʒ ii.
Pulv. cinchona..... ʒ ss.
Aqua..... ʒ iv. Misce.

This is to be applied twice a day very carefully to the full extent of the ulcerations and excoriations. "The addition of the cinchona is only useful by retaining the sulphate of copper longer in contact with the edge of the sore." Dr. Coates has also found a solution of the sulphate of zinc, ʒ i to an ounce of water, by itself or combined with tincture of myrrh, to be useful.

The odor which comes from the gangrenous mass is not only very offensive to those who are associated with the case, but has a deleterious effect upon the child, who is constantly inhaling it. Some antiseptic and deodorizer is therefore essential, the best of which is a strong solution of permanganate of potass., with which the sore may be bathed as often as necessary. Listerine is also very useful for this purpose.

The remedies which are most likely to be useful in this affection are arsenicum, thuja, mercurius and lachesis. The best preparation of mercurius for this affection is merc. dulcis. The indications for arsenicum have already been given. Lachesis is characterized by fetor of breath, gangreneous ulcerations, black and humid gangrene, salivation, and hemorrhages. The pathogenesis of thuja is such as would suggest its usefulness in this disease, but we are not aware that it has ever been thus employed. Phosphoric acid is a remedy likely to be serviceble in cases having painless diarrhea and in children who are syphilitic. It is all the more indicated if the gangrene follows measles in children with inherited taint.

CHAPTER II.

ESOPHAGITIS.

INFLAMMATION of the esophagus occurs but rarely in infancy and childhood, but often enough to require a brief consideration.

Causes.—It occurs most often in bottle-fed babies, and is due to giving food either too hot or too cold. Foods also which give rise to acidity of the stomach with attendant eructations of irritating gases may give rise to it. Occasionally it is due to an extension of stomatitis, either the simple or ulcerous form, or of thrush from the mouth into the gullet. The accidental swallowing of acrid substances, such as acids or alkalies, may be the cause, the irritant producing stomatitis and gastritis at the same time.

Anatomical Characters.—The inflamed surface of the esophagus does not always present a uniform appearance. The inflammation, instead of being spread over the mucous membrane with equal intensity, is more apt to show itself in streaks or patches. Dr. J. Lewis Smith says that he has frequently observed at autopsies a greater degree of inflammation in the lower than the upper half of the esophagus, even in cases where the infant had stomatitis at the time of death.

Symptoms.—The symptoms of esophagitis in infants are not very clearly defined. There is pain when efforts at deglutition are made, but the pain is not intense, nor are there other indications of any peculiar distress. Vomiting is not common—at least, there is no vomiting that can be referable to the esophageal inflammation. As the disease is generally an accompaniment or an extension of stomatitis downward, or of intestinal inflammation upward, its symptoms are generally masked by those of the primary disease.

Treatment.—When the latter is the case, remedies addressed to the primary affection are the proper ones for esophagitis, and no special medicines are required for its cure. Attention should be given to the diet, however, and all foods should be excluded from the dietary which are likely to cause acidity of the stomach or which conduce to indigestion in any form.

GASTRITIS.—(GASTRIC CATARRH.)

Inflammation of the stomach is not common among infants nursed at the breast, although nursing women may, by errors in diet or by reason of ill-health in themselves, or from other causes, convey to the nursling a congestion of the mucous follicles of the stomach of more or less serious character. Among children who are well born and have a good general development at birth, slight derangements in the condition of the mother or wet-nurse do not produce appreciable symptoms of indigestion, as a rule. There are exceptions to this, however. Billard and other observers have seen cases of acute gastritis in young infants who had taken nothing of an irritating character into the stomach. In connection with inflammation, either of the mouth or of the intestines, gastritis is by no means uncommon. In such cases the trouble arises from extension of the primary disorder along the mucous tract. Undoubtedly the most common form of indigestion in infancy is that which, at first at least, involves function only, and does not necessarily imply a pathological change in the stomach itself. It would be wrong to include such cases in a consideration of the subject of inflammation of the stomach, and we shall consider them in the succeeding section, under the head of Congenital Dyspepsia.

The term *gastritis* is here restricted to those cases of stomach disorder wherein there is not merely a slight indigestion, but other evidences of impairment of function due to organic lesion. This lesion may be, and often is, slight in its incipiency; but it is sufficient to retard growth and render its subject peevish, fretful and sick, and if not arrested it may easily and quickly compromise life itself.

Causes.—Defective feeding is by all means the most prolific cause of gastric catarrh in infants, and it is amazing what serious consequences may result from a very trifling departure from strict physiological requirements in the matter of food. In nurslings, if the milk of the wet-nurse is a little too old, or if the infant is put to the breast too often, a condition of irritability is set up which ultimately results in inflammation or gastric catarrh. Insufficient clothing may result in a sudden check to the cutaneous circulation, or too rapid cooling of the body after being heated in play may cause a congestion of the mucous membrane of the stomach, when a comparatively trifling error in diet, which under other circumstances would do no harm whatever, may now result in a derangement of serious character. A neglect of sanitary precautions, such as air, light, exercise and

ventilation; the depressing influences of dentition and the acute ailments and specific fevers, so common in childhood; any or all of these may reduce the nervous force and bring about derangement of the complicated functions of digestion. An inflammation of considerable extent and serious type may be produced by the infant swallowing liquids which are too hot or too cold, or containing spices or other irritants, which inflame the esophagus first and the stomach afterward. We once saw a case of acute gastritis in an infant less than a year old caused by tartar emetic in the third decimal trituration. The attack lasted for some days and was attended with constant vomiting and retching.

Symptoms.—The first noticeable departure from a state of health in cases of gastritis is shown is loss of apetite with vomiting of ingested food or drink. Nausea, as evidenced by gagging, is an early symptom and this is soon replaced by persistent throwing up of everything taken into the stomach. If milk is taken, it comes from the stomach curdled. The vomiting is not ended with the ejection of food; it continues until mucus and perhaps bile are expelled. The tongue soon becomes coated along its center with a white, moist, pasty coating, while the edges are red and glazed. The papillæ of the tongue are raised and project through the coating, dotting the organ with bright red spots. Other portions of the mucous membrane are apt to be involved, so that coryza or mucus purging may be present. Under such circumstances it is often thought that the child has taken cold, and a mistaken diagnosis may lead to medication of the air passages. After a variable time, normal digestion may return, sometimes rapidly, but more often slowly. Repeated attacks speedily influence the general health, which again reacts upon the stomach and favors an early recurrence of the trouble. There is sometimes considerable elevation of temperature in these cases, but often in mild attacks there is no perceptible pyrexia. Tenderness over the epigastrium is not a constant symptom, nor is it ever extreme. Pain is felt in the region of the stomach if the disease is acute, especially after eating; but often the pain is so slight as to be hardly noticeable. The breath is foul and the flow of saliva may be much increased. Herpetic blisters (hydroa) are apt to appear about the mouth, especially if the systemic disturbance is great. Nervous symptoms are very common, sometimes of a convulsive character, and at others a disturbance of the mental state is noticeable. Cases of aphasia have been observed by Henoch and others from this cause. Very young children may have spasms that are either tonic or clonic, or both states may be present.

There may be a disturbance of the respiratory function amounting in some to croup of the spasmodic variety, and in others to dyspeptic or gastric asthma.

The diagnosis of acute gastritis is much easier that when it presents itself in a chronic form. In the former case vomiting, rapid emaciation and epigastric pain are the chief points to be considered, while in the latter our diagnosis is often obscured by the ill-defined character of the symptoms, and also by the presence of symptoms having but a remote relation to the stomach.

Where persistent vomiting is present, however, and steady emaciation progresses out of proportion to the gravity of co-existing symptoms, gastritis is doubtless present, whether there be pain in, or tenderness over, the stomach or not.

In uncomplicated cases the bowels are apt to be constipated, but there is nearly always a diarrhea from the presence of entro-colitis.

Prognosis.—Unless the inflammation is so severe or so protracted as to disintegrate the mucous membrane of the stomach, there is no reason why it may not yield to judicious treatment and subside before the life of the infant is compromised. When the inflammation is associated with severe thrush, the chances are unfavorable, and the same is true with entero-colitis. When death ensues, it is generally from exhaustion.

Treatment.—The first thing to be done in cases of gastritis is to ascertain the cause of the inflammation, for so long as the cause is operative, the inflammation will continue. If this be in the mother's milk, the infant should be weaned at once, or a suitable wet-nurse substituted.

If bottle-fed, the habitual food should be changed to that which is more bland and unirritating. Barley water, rice water, or arrowroot should be given in place of foods less easily digested. Cream should be substituted for milk temporarily, and in cases of great prostration, when all food is rejected from the stomach, nutritive enemata may be used to great advantage. Murdock's food is admirably adapted for this purpose, and a child can be nourished by it per rectum for a considerable time. In some cases it is absolutely useless to attempt to use the stomach for alimenation until the inflammation subsides. Not long since we saw a case of this kind in consultation with our friend, Dr. S. P. Hedges. The patient was an infant about a year old. At the time of my first visit the stomach would retain nothing—not even water. Champagne in a few-drops doses, was instantly ejected; koumiss had been tried without avail. The infant was desperately thirsty and clutched a cup of water with the greatest avidity. Under

these circumstances, even medication by the stomach was out of the question. The attack was an acute one and the child had been previously in good health. It was, therefore, well nourished and it was decided to give the stomach perfect rest for a day or two. Nutritive enemata were given at intervals and in the course of a couple of days the stomach had so far recovered that barley water was retained and digested. A week later the gastritis had entirely disappeared and did not recur. Since there is an excess of acid in all mucous inflammations, lime water or bicarb. of soda should be mixed with the milk, if the latter is tolerated. Cloths wrung out of hot water and placed over the stomach are very helpful, or a poultice of ground flaxseed applied hot and covered with oil silk.

REMEDIES.

Aconite.—In the beginning of an attack.

Bryonia.—Abdomen distended with gas and tender to the touch, violent thirst, cold hands and feet.

Belladonna.—Pupils dilated; stupor; empty retching; symptoms indicating encephalic fever; jerking and twitching of muscles. Hartmann says that bryonia and belladonna are particularly suitable if the symptoms of gastritis develop themselves shortly after the child is weaned.

Ipecacuanha.—Vomiting and retching continually, with other characteristic symptoms.

Calcarea Carb.—The intestinal canal seems to be more affected than the stomach; tendency to diarrhea more marked than the urging to vomit; passages smell sour and have the color of clay; great restlessness and debility; especially indicated if the child is teething.

Kreasotum.—This remedy is highly recommended by Jahr, who, however, does not give the special indications for its use. He says: "Before I became acquainted with the splendid virtues of kreasotum I had already lost three cases of gastritis, whom I had treated with calcarea and arsenicum. Since I have used kreasotum I have not met with a single loss."

Tartar Emetic.—Frequent sour vomiting; empty retching and straining to vomit, with ineffectual urging to diarrheaic stool, or with slimy diarrhea; drowsiness with contracted pupils, quiet breathing and very bad humor; the child cannot be touched without causing it to cry. "The drowsiness and contracted pupils are characteristic indications for tartar emetic, whereas a condition bordering on soper speaks more in favor of belladonna."

Arsenicum, Veratrum Alb. and *Phosphoric Acid,* are all

spoken of favorably by those who have a right to speak authoratively on the subject.

Argentum Nitras.—This remedy, although the last on the list, is by no means considered the least valuable by those who have used it. It is more clearly homeopathic to a pure gastritis than any drug hitherto mentioned. The indications for its employment are: excessive flatulence, the stomach seems ready to burst, copious eructations, which are accomplished only after persistent effort, and are very violent. The patient is in a condition of apathy.

If the child is old enough to describe his symptoms, he complains of *great burning* in the stomach. This last symptom is very characteristic.

Dr. William Pepper, in the "Cyclopedia of Diseases of Children," vol. III., page 16, thus speaks of this drug: "There is no remedy which can be given, even to the youngest infant, with more confidence than nitrate of silver in those cases where the gastric irritability is excessive, so that vomiting is a chronic condition. Indeed, in all the catarrhal affections of the gastro-intestinal mucous membrane in children, this remedy possesses remarkable value, although it requires great tact to determine the dose and the frequency, and times of administration best adapted to each case."

Dr. Pepper gives a formula for its exhibition containing one-sixtieth of a grain (*sic*) at a dose, dissolved in a teaspoonful of water. Our 3x trit. dissolved in water is far more effective.

CHAPTER III.

CONGENITAL DYSPEPSIA.

THIS term is used deliberately to designate certain forms of indigestion attended by mal-assimilation, and yet which do not exhibit any of the recognizable signs of inflammation; nor are they found post mortem, to have any appreciable lesion in the digestive canal. There is no pathological change in the mucous membrane of the stomach; there is no rise in temperature to indicate pyrexia; there is wasting, steady and persistent atrophy; and yet no clue to the cause of the trouble save that of functional indigestion. These cases occur often in young infants who, soon after birth and without apparent cause, fall into a state of decline and fail to grow and thrive as a well-nourished infant ought to do, and yet whose earliest morbid symptoms are very different from those dependent on tuberculosis, rachitis, or other of the well-marked cachexias.

Marasmus is the term which has most commonly been used to describe these cases, but they are also referred to under the head of atrophy, inanition, wasting, and recently MM. Parrot and Robin have proposed a new term, *athrepsia*, which, from its derivation, is eminently scientific and clearly descriptive; but as this term has not as yet come into general use, I prefer the more familiar word "dyspepsia" to any other, as indicating not only the nature of the disease, but also its cause, which is in all cases a fault or failure of the digestive function. In a given case the fault may be in the organs of assimilation; in another, in an insufficiency or inefficiency of the liver; and again, the trouble, so far as we can tell, is due solely to a lack of innervation, in which case the stomach is wanting in nervous tone, in stamina, in digestive power. In any case there is the prime condition of indigestion or dyspepsia, and as a result thereof we have mal-nutrition.

Most of these babies of which I speak, are plump and well-nourished enough at birth, and it is only after weeks, or months in some cases, before any serious impairment of nutrition becomes noticeable, athough, in most cases, this is manifest at an earlier period, and in all cases, the proximity to birth, when more or less failure becomes apparent, warrants the presumption that the cause of the trouble is ante- rather than post-

natal, and that the designation of congenital dyspepsia is not inappropriate.

That some, if not many, of these cases are not only congenital, but involve also the question of heredity, will be apparent from cases to be cited hereafter.

I am fully aware of the fact that some defect in the milk of the mother or nurse, is a prolific source of trouble in the early period of infancy; and a badly-selected food in bottle-fed children may quickly disorder the stomach; but the infants here referred to are inclined to waste and decline, and grow thinner and thinner on the best of food; and indeed the better the food, the more they fail to thrive.

With some babies, the slightest indiscretion in the mother's diet gives rise to complaint, while with other children the same mother may eat fruit and vegetables, and enjoy the widest latitude in eating with impunity.

These cases of congenital dyspepsia may be readily differentiated from the acute and accidental disorders of the alimentary canal, such as gastritis, enteritis, entero-colitis, etc., not only by the generally well-marked peculiarities of these latter affections, but by the added fact that with them we have a period of health, and growth, and thrift, preceding the invasion of disease or decline, and usually, especially in serious forms of these diseases, we have more or less fever with its attendant and unmistakable symptoms.

In congenital dyspepsia, we have a steady and progressive, but slow emaciation; an unsatisfied craving for food which engenders restlessness, wakefulness, and distressful crying; but there is an absence of pyrexia, excepting, perhaps, occasional and slight febrile movements of an irritative character, which are transient in duration.

The importance of recognizing these cases, and distinguishing them from other cachexias arises from the fact that if there be only functional impairment, as is usually the case, the prognosis is much more favorable than it can be, if a more profound morbid tendency be present, involving constitutional taint; and the medicinal and hygienic management of these cases must be very different from what they would be of necessity under the latter circumstances.

Two illustrative cases will serve to indicate what is here meant by congenital dyspepsia:

Case 1.—Baby E., female, born December 5, 1880, at full term; weighed eight to nine pounds; slept most of the time during the first few days; its passages were normal and regular, and indeed the baby seemed perfectly healthy in all respects. For a week or more all went well, excepting that

frequently after nursing there would be some vomiting, accompanied by eructations of wind, and oftentimes crying as if from colic. After this the baby cried almost incessantly, unless carried in the arms; and during several succeeding months, there was but little peace or quiet in this household. When the baby was about two weeks old, and as soon as it manifested signs that something was wrong, I examined the mother's milk carefully and repeatedly, and compared it with the milk of two other women who were confined about the same time. It was apparently the best of the three specimens.

I could not believe that the milk was at fault, and urged continued nursing. The baby continued, however, to cry and pine.

The mother had plenty of nourishment, and it was taken with avidity. The bowels were not especially disturbed; vomiting was only slight and occasional. After the third week I yielded my judgment to that of the parents, and commenced artificial feeding—first trying a wet-nurse without any improvement.

The history of the succeeding year, if complete, would fill a fair-sized volume. I tried nearly all available aliments from cow's milk, fresh and condensed, on through nearly the entire list of foods. When eight months old the baby's condition was indeed pitiable. She was but little larger than when born. The skin of the legs, arms and body could be raised in folds; that of the face was wrinkled and old-looking—in short, I had a typical case of marasmus, with all that the name implies. About this time, cerebral symptoms set in; such as starting in sleep, with a sharp, shrill cry—the "cri encephalique"—boring of the head into the pillow; pupils of eyes sometimes dilated, and again contracted; a whining, distressful cry was almost continuous, unless kept in motion. Thrush showed itself in the mouth; and extensive erythema about the arms occurred at a somewhat earlier period, and both were more or less obstinate. At a later period a dropsical condition, which was more or less general, was manifested. Edema of the lower extremities was especially marked, and serous tumors would form on the head, sometimes closely simulating a hydrocephaloid condition. All of these intercurrent symptoms yielded more or less readily to the indicated and usual remedies, leaving the marasmatic condition, however, but little improved. Finally, however, after exhausting my resources, and in sheer desperation, I prepared a mixture of gelatine and arrowroot, according to the formula of Meigs and Pepper. Even this did not answer until all cream was substituted for milk and cream, as by them directed. In this case there was a complete and continuous

inability to digest casein, and a similar inability is met with not infrequently.

In the conduct of the case, injections of Valentine's meat-juice were used, as well as daily inunctions of olive oil. But with all my efforts to support nutrition, and in spite of all expedients which were well-nigh exhaustive, it was not until the above preparation of gelatine and arrowroot was used that I could see perceptible improvement. From its exhibition the baby commenced to gain, very slowly but surely, and has continued to do so to the present time. At this writing—the baby being now eighteen months old—her condition is as follows: She has six teeth, anterior fontanel unclosed, but closing; appetite and digestion good; sleeps well; is happy and playful; creeps about the floor, but cannot stand; she is small in size, but her appearance is natural and healthy, and her face has lost all trace of suffering and disease. She is slowly but steadily growing out of a condition, which seemed for weeks and even months, to be almost hopeless.

But why should this child so soon after birth—a plump and hearty child when born—have drifted into such an apparently hopeless and pitiable condition?

While studying the case I elicited the following facts, which seemed to help answer the question, and convinced me that heredity had much to do with it. This was the fifth baby born to this family. The first one weighed thirteen pounds at birth, showed marked indigestion before it was a month old, and died at the age of seven months.

The second weighed ten pounds at birth; was nursed three weeks; then put upon artificial food, but continued to decline, and died at the age of seven weeks, from purging and vomiting.

The third and fourth children were not nursed at all, but Harry (the fourth) had marasmus dating from his second month, which lasted until he was nearly a year old. The third child, now eight years old, has frequent attacks of indigestion accompanied with epileptoid fits. Both of them are under-sized and cachectic.

Mrs. E., the mother, is a remarkably strong and healthy woman; says she has never had a sick day in her life. Her father, however, was dyspeptic, and she has three aunts who are confirmed dyspeptics.

The father of the family is a Virginian by birth; a man of splendid physique, standing over six feet in his stockings; a man of large appetite and larger passions. He is highly educated, being a civil engineer by profession; has traveled the world over in pursuit of business or pleasure, and, being a thorough *gourmand*, has had indigestion in nearly every civil-

ized country on the globe. He has no other defect of organization that I have been able to discover, and hence the question recurs, why have these parents, who in a general way are so exceptionally strong and vigorous, had such a succession of puny and delicate children? I cannot help the conclusion that the abused and deranged stomach of the father has been transmitted to the children, reproducing in them a dyspeptic condition, according to the well-recognized laws of heredity.

Case 2.—Mrs. L., 35 years old; weight 110 lbs; height 5 feet 6 inches; married 13 years; has had six children with easy labor. Last child born August 6, 1881. Baby was plump and weighed eight pounds when two weeks old. From birth had colic; constipation, alternating with diarrhea; eructations of wind; vomiting of curdy masses; stools natural enough in color; fetid diarrhea for three days before death, which occurred at end of eighth week. The baby did not grow and increase in weight, but was not especially emaciated. Four of the other children died in the same manner at about the same age, none of them living beyond the third month, although all were plump and well-nourished at birth. The fourth child in the order of birth and the one living, now eight years old, has a very delicate stomach, and was only raised thus far by dint of care. She was wet-nursed for a time, as was the third child, which died at the age of six weeks.

This woman's mother was always a dyspeptic, and died in middle life of gradual decline. She herself has had chronic diarrhea most of the time since she can remember, in spite of which she neither looks nor acts like an invalid. By carefully regulating her diet, which experience has taught her to do, she maintains an average amount of vigor. While having a somewhat delicate look, she has good color, skin clear, lips red. Being a lady of rare culture and somewhat reduced in circumstances, she has been obliged to do more or less labor of a kind that has taxed her mind and nervous system, and she thinks her babies have died from participating in her "nervous exhaustion." That this is not so, is evidenced from the fact that so long as her children share her blood and are nourished by her direct, they are well and strong, and are born red and plump. But as soon as they are thrown on their own resources, in the matter of digestion, they fail to thrive, and speedily perish. None of them ever had convulsions. The father of this family claims to have good digestion. He is, however, thin, scrawny and undersized. Morbus coxalgia in early life left one leg shorter than the other.

In both the cases here cited, the presumption of an inherited defect of the nutritive function is certainly probable and war-

ranted by logic and analogy. That function, as well as organization, may be and is inherited is evidenced by volumes of authenticated facts.

I know well a family of ten grown persons, all of whom have children of their own. In three generations there is not a poor or weak stomach, nor is indigestion known among them. Every member of the family from grandparents to grandchildren are hearty, ruddy and strong, and all are good feeders; but every grown member of this family has defective vision, and some of them have worn glasses from puberty.

Zimmerman cites the case of a whole family upon whom coffee acted as opium acts on others, while opium had no sensible effect whatever. Sir Henry Holland says that he knows of a family where four out of five children, otherwise healthy, became totally blind from amaurosis about the age of twelve, the vision having been gradually impaired up to this time.

Indeed, the evidence is ample to show that we inherit from our parents, not alone the general form and features, the bony, muscular, nervous and glandular structures, but the foibles, the weaknesses, susceptibilities and morbid tendencies as well. But I do not propose to discuss here the general question of disease transmission, nor insist upon it that all cases of defective nutrition in the infant are inherited; but I do maintain that many, if not most of them, date from birth, and are hence *congenital.*

The practical and all-important deduction from these premises is that the physician who has to treat these babies must be quick to realize the situation, and treat them accordingly. No Procrustean bed will answer for these cases. It will not do here to force unassimilable food. Their weak and delicate stomachs are utterly unable to appropriate and absorb that which is generally regarded as wholesome and nutritive. What is *cibus deorum* to a healthy babe is *stercus diaboli* to such children as these.

And yet these cases are by no means hopeless. On the contrary, a careful and intelligent selection of food, a judicious but persistent hygiene, and the homeopathic treatment of the symptoms as they arise, will surprise the most sanguine and excite the wonder of those who are disposed to be skeptical.

Diagnosis.—A word or two upon the diagnosis and treatment of these cases. But little need be said under either heading, but that little may be important to the junior members of the profession.

The only one of the constitutional diseases which is likely to be mistaken for congenital dyspepsia is tabes mesenterica; but

there are certain distinctive differences which will be very apparent, by a comparison of the two affections.

TABES MESENTERICA.	CONGENITAL DYSPEPSIA.
Mesenteric glands always hypertrophied.	Mesenteric glands not hypertrophied.
Appetite voracious.	Appetite variable.
Stools liquid, putrid and corroding.	Stools thin and frequent but not putrid.
Fever intense and continuous.	No continued fever.
Greedy thirst.	Little or no thirst.
Tympanitis always and continuous.	Tympanitis occasional and transient.
Commences during dentition.	Prior to dentition.
Atrophy of brain, with distortion of calvaria.	Head preserves its normal contour.
Great debility and prostration.	Strength well maintained.
Dropsy early in the disease.	Dropsy late.
Fatal tendency.	Prognosis hopeful.
Emaciation rapid.	Emaciation slow and gradual.

Histological.—As to the morbid anatomy of this affection, little is definitely known. Those that die generally perish from some intercurrent complication which was not necessarily part of the original trouble.

Primarily there is only one morbid condition: a functional deficiency, a lack of digestive power. The peptic glands may be sufficiently matured, but they are inactive. The liver may be relatively proportionate, so far as size and bulk are concerned, to the general weight, but it is sluggish and inefficient. In consequence the stools are white or grayish and papescent.

That a congenital feebleness of the digestive function, such as is here indicated, may exist even to a fatal extent, is shown by some experiments of Claude Bernard on the lower animals. He says, "Experience has taught us that patients often die without offering in the *post-mortem* examination the slightest modification in the anatomical condition of their organs. In the course of our physiological experiments, we often see dogs arrive at the very last stage of emaciation, although the appetite continues unimpaired till the last moment. They sink from sheer exhaustion, while the lacteals are gorged with chyle; and, when opened, their bodies offer no trace whatever of pathological alteration."*

Treatment.—I need scarcely say, there is no specific for this affection. Each case will show peculiarities which will require a careful study of remedies and render a selection oftentimes difficult. The symptoms alone will furnish a safe guide. At certain stages the remedies will have to be changed frequently

* Lecture on Experimental Physiology, by Claude M. Bernard, *Med. Times and Gazette*, 1860, vol. 1, page 209.

to meet new and sometimes unexpected complications. The treatment must always, of necessity, be largely dietetic and hygienic, and the aliment must be selected with reference to the capacity of the given case. In these cases rules which should govern healthy children, must be ignored, or at least held in abeyance. In the selection of food, it will often be found that a most unpromising food for a well-bred stomach will be just the thing here, *e. g.*, gelatine and arrowroot, as in the case before cited.

One thing must not be forgotten. These children cannot digest *casein* without artificial help. Theoretically, the addition of a small quantity of Hale's comp. digest, or lacto-peptine, ought to aid its digestibility. By the addition of pepsin in some form the nitrogenous element of the milk ought to be sufficiently *peptonized* before taken into the stomach to render the milk perfectly assimilable. Practically, my experience has been so limited with these "aids," that I cannot speak authoritatively. Cream, either clear or mixed with Mellin's food and made very dilute, has usually served me well, and has proven in several cases the only food for the incipient stage. Cod-liver oil, in emulsion or otherwise, will often prove serviceable. Inunctions of olive oil, cod-liver oil or the more elegant preparation known as the "unguentum graecorum," which is made of cocoa-butter and almond oil, is of decided advantage and should be used daily. The oil bath should be substituted for the water bath, the latter being used as sparingly as possible.

The value of fresh air is inestimable, and should never be forgotten. Warmth is a *sine qua non* of cure, and it is almost impossible to keep these children too warm. Their blood easily chills, and they require to be kept in a warmer room, and to be more warmly clad than their more robust brothers and sisters.

CHAPTER IV.

DIARRHEA.

Definition and Characteristics.—Diarrhea is one of the most frequent of all the ailments of infancy and childhood. By the term is meant, an unusual frequency of the alvine discharges with more or less change in their peculiar characteristics. The normal frequency of stools in a healthy infant during its first month should be from three to four in the twenty-four hours. After this period and during the first year, the daily average of stools should be at least two and in a hearty child may be double this number without any cause for apprehension, provided the character of the stool is normal and the system does not suffer in consequence.

Immediately after birth the discharges from the bowels are dark-green or brown or even black in color, due to the meconium. During the early period of infancy, the discharges are of a soft, papescent character, light yellow in color, and devoid of fetor. During the remainder of infancy, they are still soft, more frequent than in adult life and yellow or of light-brownish hue. Normal stools in infancy are homogeneous in character, whatever the consistency or color.

Light gray or clay-colored stools denote an absence of bile and may indicate hepatic disease.

In chronic diarrhea, the stools are thin, dark-brown and intolerably fetid. Meat juice, especially the meat extracts, give to the stools a dark color and great fetor.

The dark-green color of the stools is due to bile, which is turned green by the acid character of the intestinal secretions.

Where bright blood is passed in the stools it comes from the colon; blood from the ileum is turned brown before being discharged.

Frothy acid discharges from the bowels, of a light yellow or slightly green color, indicate a disturbance of the digestive functions; generally from overfeeding or improper food.

Discharges of slimy mucus occur in irritations of the bowels, from worms or teething; or they are the consequence of an increase of the mucus exhalation of the follicles of the intestines, caused by the impression of cold upon the surface.

Repeated discharges of viscid mucus, occasionally streaked

with blood, or of a greenish fluid, mixed with small masses resembling the curd of milk, are frequent in most of the inflammatory affections of the bowels.

A deep-green color of the stools, the discharges resembling chopped grass or spinach, is generally a symptom of serious disease of the stomach or intestines; and is a striking feature of acute gastritis, and the more acute grades of gastro-intestinal inflammations.

A diminution in the number of stools, when diarrhea occurs as a symptom of disease in children, with a return to the ordinary healthy condition in the color and consistence of the discharges, is a favorable symptom. So, also, is the appearance of natural feces in cases of dysentery, and of bile in the discharges in cholera infantum.

The passage from the bowels of the substances taken as food entirely unchanged, or but little altered, constitutes a condition called lienteria, and indicates excessive irritability of the alimentary canal. It occurs in inflammation of the stomach and bowels, but more frequently in protracted cases of cholera infantum and chronic diarrhea.

Diarrhea in children does not always indicate disease, nor does it always call for medicinal treatment. When irritating substances have been taken into the stomach, which are not nutritious and cannot be made useful in the economy, nature seeks to rid herself of the foreign substance, either by vomiting or a salutary diarrhea. In either case, it would be folly to interfere with the process, since no possible good could be accomplished by so doing. But it often happens that the diarrhea, which was salutary in the beginning, continues even after the end is accomplished from the irritation thus set up, and needs to be controlled before serious, or at least, unnecessary loss of strength is occasioned.

Some writers divide this subject of diarrhea into a great number of varieties, basing the division upon the location of the pathological lesion, or its supposed location, and again multiplying terms according to the real or fancied condition causing the diarrhea. These pathological names are in our judgment a hindrance rather than a benefit, since nothing short of a *post-mortem* investigation can determine in a given case, whether the exact seat of the lesion is in the upper, lower, or middle third of the ileum, or an inch beyond its junction with the colon. The division of diarrheas into bilious, mucous and serous has a better recommendation; but this is more theoretical than practical, since the discharges rarely maintain for a length of time the characteristics with which they began. In order to avoid prolixity and retain sufficient accuracy of description for all

practical purposes, we shall consider all forms of diarrhea under the following heads, *viz.*: Simple, or non-inflammatory diarrhea; entero-colitis, or inflammatory diarrhea; cholerine, or cholera infantum, and hemorrhagic diarrhea, or dysentery.

SIMPLE DIARRHEA — *Definition.* — This is the most frequent form of diarrhea encountered in infancy and childhood. It is non-inflammatory in character, but if its producing cause be not arrested, it may lead to a catarrh of the bowels or to inflammation (entero-colitis). Its duration is variable. It may last but a few hours, and then cease spontaneously, or the evacuations may occur every few minutes and continue with little or no abatement for a considerable length of time, exhausting the strength of the patient and producing extreme emaciation.

Causes.—The causes which may give rise to this form of diarrhea are innumerable. Anything which disturbs the function of alimentation, in the way of food which is not assimilable, or which disorders the nervous system so as to lower the tone of the digestive apparatus; anything which checks the cutaneous transpiration and thus congests the mucous membrane; anything which disturbs the equilibrium of the circulation; any or all of these influences may give rise to simple diarrhea. Probably the most prolific causes are acrid or irritating food, and the influence of cold. The use of farinaceous food at too early an age, when the digestive powers of the infant are unequal to the task of effecting the necessary changes in it to render it assimilable, has already been spoken of and its dangers pointed out. Other articles of food are perhaps equally injurious. The unhealthy state of the nurse's milk is another cause of frequent occurrence. The indiscriminate diet allowed after an infant is weaned is a fruitful source of gastric and intestinal complaints. So also is the effect of cold and wet applied to the surface of the body, and still more, the sudden transition from a heated to a chilly atmosphere. The effect is to constringe the skin, and direct the course of the blood to the internal surfaces, where it first produces engorgement of the vessels and then a relaxation of them. Insufficient clothing, especially in our changeable northern climate, is responsible for many a diarrhea of more or less serious character. Infants who are carelessly allowed to become uncovered at night after the fires have gone down are very liable to bowel complaint. Extreme heat, if much prolonged, is a well-known cause of diarrhea. Its effect is to relax the system and produce an enervated condition at variance with the demands of complete digestion. Certain foods, too, are espe-

cially liable to fermentative changes in hot weather, and if taken into the stomach quickly produce disorder there or in the intestinal tract below. The influence of dentition in this connection will be treated subsequently under its appropriate head.

Histological.—Simple diarrhea is a purely functional phenomenon, and therefore is not accompanied by any structural or anatomical change, unless tumefacation of intestinal follicles may be so regarded. There may be in these cases some diminished firmness of the mucous membrane, and more or less swelling of the glands of Peyer, but no lesions characteristic of inflammation. Niemeyer—and others also—describe all forms of diarrhea, even the mildest, under the term "catarrhal inflammation," and consider even the transient effects of a purgative as an incipient catarrh. But it seems much more rational to regard those diarrheas, which immediately abate with the removal of the cause and which are unattended by marked anatomical change, as non-inflammatory.

Symptoms.—Simple diarrhea may come on suddenly and without precursory symptoms or indications of gastric uneasiness, or symptoms of indigestion may precede for a day or two. When these prodromic symptoms are present they are ill defined and are mainly restlessness, disturbed sleep, transient abdominal pains, loss of appetite and perhaps nausea or vomiting. The stools vary greatly, both in color and character. In young infants they are apt to be green, even when the cause is most trivial. If the diarrhea occurs in a nursing infant or one who is bottle-fed, particles of coagulated casein are apt to be scattered through the stool. If the stools are acid in their reaction or to any extent irritating, there may be more or less tenesmus. The frequency of stools diminishes during the night, for the reason that food and drink are then suspended. In mild attacks there is but little thirst, but if the stools are frequent and copious, the thirst may be great. The tongue is moist. There may be some meteorism, but no abdominal tenderness. The loss of weight and firmness of flesh which may follow or result from a simple diarrhea in a brief space of time is amazing. A few days may suffice to lose the rotundity of limbs and render the tissues soft and flabby. The great danger in simple, non-inflammatory diarrhea arises from the fact that it may speedily and imperceptibly take on an inflammatory form, or if the season be favorable, that more serious one still—cholera infantum. In mild cases the stools do not altogether lose their feculent character, but are more frequent, copious and thinner, and the odor becomes pungent and offensive.

Prognosis.—So long as the diarrhea remains simple the prog-

nosis is favorable, even though the emaciation be considerable and the disease prolonged. During the heat of summer there is more danger than when the weather is cool, and always more danger in city than in country.

The greatest danger arising from simple diarrhea, is from exhaustion. The drain upon the fluids of the body and the consequent exhaustion may produce such a condition of debility as to affect the brain and cause spurious hydrocephalus. The physician should always be on his guard in severe cases of diarrhea lest the exhaustion resulting therefrom be more profound than he is aware of. The cessation of the discharges is not always a good omen. It may be due to such a state of enervation that the secretory function of the intestines is suspended, or to a failure of the peristaltic movements of the bowels. We can never be sure that all danger is past, until amendment has been maintained for a day, and normal stools have appeared.

Treatment.—In order to avoid needless repetition we shall treat all the forms of diarrhea together at the close of the chapter.

INFLAMMATORY DIARRHEA.—(Entero-colitis; Febrile Diarrhea; Intestinal Catarrh.)

Definition.—Under this head we propose to treat of that form of diarrhea which is attended with fever and other symptoms of intestinal inflammation, whether it be situated in the ileum, the colon, or, as is commonly the case, in both.

We have already referred to the difficulty of locating with any exactitude the precise seat of the intestinal lesion in these cases, and writers generally are free to admit that there is no special difference in the symptoms by which one can tell, in a given case, whether the inflammation is in the small or the large bowel. Billard, who is conceded to be one of the closest of observers, after analyzing eighty cases of intestinal inflammation in infants, says: "In consequence of the impossibility we have found to exist of tracing with exactitude the series of symptoms proper to inflammation of the different portions of the digestive tube, we shall content ourselves with presenting an analytical sketch of the causes, symptoms, and ordinary course of inflammation of the mucous membrane of the intestines in general."

In using either of the above terms, therefore, we shall intend to refer to an inflammatory condition of the bowels, without special reference to its exact locality, or whether the inflammatory process be extensive or limited.

COMPARATIVE MORTALITY OF DIARRHEAL DISEASES BY QUARTERS FOR EIGHT YEARS, FROM 1885 TO 1892 INCLUSIVE.

Quarters.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	Total for Quarters.
Spring.....	187	162	233	129	88	177	350	262	1588
Summer.....	861	841	1036	1018	1350	1284	1286	1347	8923
Autumn.....	65	88	71	71	151	105	218	145	914
Winter.....	35	43	79	38	29	151	141	113	629
Totals by yrs.	1148	1134	1419	1256	1618	1717	1995	1867	12054

MORTALITY, BY MONTHS, FOR YEAR 1892.

Month.	Cause of Death.			
	Cholera Infantum.	Dysentery.	Entero-Colitis.	Simple Diarrhea.
January.....	26	6	13	19
February.....	8	5	9	5
March.....	9	1	6	3
April	22	2	21	11
May	25	4	17	10
June	98	2	34	9
July.....	444	8	62	47
August.....	360	11	84	49
September	155	6	46	35
October	42	4	13	21
November.....	13	2	10	9
December	9	3	11	5
Total.....	1211	54	326	223

Etiology.—It seems unnecessary to repeat again what has been said in a previous section regarding the causative influences that are a constant menace to the lives of infants and children, especially those who live in our large cities. What is there said of the causes of simple diarrhea is equally true of that inflammatory form which we are now considering. There are some lessons to be drawn, however, from the foregoing tables of statistics which ought to be impressed upon the reader. The great mortality from diarrheal diseases during the months of June, July and August would naturally lead one to infer that

the heat of summer was the principal, if not the only factor involved, and that the greater the elevation of temperature in a given year, the greater the consequent mortality. This is only partially true. If it were wholly so, we should expect to find the relative mortality just as great in proportion in the smaller towns and in the open country as in the wards of a great city. But this is not borne out by the facts.

Entero-colitis is by no means as prevalent proportionally to population in the former as in the latter. Indeed, it is comparatively rare for a child to die of summer complaint in the country, although the difference in temperature between it and the city may be but little. There is manifestly another factor which has a greater influence than mere heat, and this factor is a sanitary one.

In the large cities the population is overcrowded, and the poorer classes live in cellars that are damp, and alleys that are reeking with filth. Besides this, the food supply is stale and already undergoing incipient decomposition before it reaches the consumer; and here we have the real cause of the terrible mortality that gives the urban infant less than one chance in two to see its fifth birthday. In Paris, where the streets are kept clean both summer and winter, and where overcrowding is forbidden by law, where all food is inspected before it is distributed, there is no such mortality as we have in this country and England. A lady once told me that she was going to Paris soon where her parents resided, in order that her babe might escape the perils of its second summer. "Because, you know," she said, "in Paris babies do not have any 'second summer.'" In the Foundlings' Home in this city nearly every bottle-fed infant dies before the summer is over. But such facts as these are too well known to require discussion. In this city, every summer, as soon as the warm weather begins, through the munificent bounty of my friend, Mr. Victor F. Lawson, proprietor of the *Chicago Daily News*, a sanitarium is opened on the lake shore, opposite Lincoln Park, where infants and children are brought from all over the city, and permitted to remain there throughout the day, enjoying the lake breezes from morning till night, as well as a ride on the open water on steamers that transport them back and forth. While at the sanitarium they are supplied with fresh milk and other foods, the best the market affords. In this way the lives of scores, if not hundreds, of children are saved every summer. I have repeatedly seen the good effects, in my private practice, of sending infants, affected with diarrhea, on the water for a daily trip. The value of fresh air and the cool, uncontaminated atmosphere of the lake is quickly apparent.

The great difficulty, which almost amounts to an impossibility, of obtaining cow's milk in the city before it has undergone more or less decomposition, has induced me of late years to advise mothers to use only condensed milk during the summer months. I have seen a material abatement of bowel troubles since I have done so.

But no preparation of milk or other food compares, for very young infants, with breast milk, and this should always be secured, if possible, for those under nine or ten months of age.

Symptoms.—The inflammatory diarrhea of infancy commonly commences with a slight febrile movement, with restlessness and languor and a diarrhea so mild as scarcely to attract attention. The stools, while thinner than usual and somewhat more frequent, vary greatly in appearance, being at first yellow, brown or green.

The tongue in the commencement of the attack is usually moist, but as the disease advances it becomes more dry and is covered with a light fur. Vomiting is common, especially in severe cases. In sub-acute cases the stools are not very frequent, numbering not over four or five in twenty-four hours; but they have a very bad odor and contain mucus and undigested food. The food remains depend of course on the diet. If this is milk principally, white masses of fat and occasional particles of curd are constant. If the food consists of oat-meal, rice or barley, these cereals can be readily detected in the stools with the naked eye. If only broths, peptones and other pre-digested foods are given, the stools may consist almost entirely of intestinal secretions, mucus, bile and epithelium cells. The most constant feature of these stools is glairy mucus, stained with bile and mixed with fecal masses and undigested food. Fresh blood is rarely seen, except occasionally in the beginning of the attack, and then is due rather to congestion than ulceration. In severe or acute cases the number of stools may be as high as twenty or thirty in twenty-four hours; but the larger proportion of them is usually small in amount, being often only a little mucus, or mucus streaked with blood. The frequency of the stools is greater during the day than night. After the disease has lasted for a time, the moist tongue becomes dry and parched and the lips crack and bleed. All varieties of stomatitis are liable to be present in these cases, but thrush is by far the most common. In some cases the stools are quite uniform in appearance throughout the disease, but more often they are variable, no two of them being alike. The skin is usually dry and the quantity of urine is diminished. In protracted cases the acrid character of the stools excoriates the nates, and produces an

erythema which may extend down and around the thighs and lower part of the abdomen. Boils on the forehead and scalp are common and troublesome.

On account of the enfeebled circulation, hypostatic pneumonia is common, affecting usually the posterior and inferior portions of the lobes and extending but a little way into the lungs. The only prominent symptom of hypostatic pneumonia being present, according to Dr. J. Lewis Smith, is an occasional cough. Limited to a small and almost immovable portion of the lung, it does not ordinarily accelerate respiration or render it painful, and the cough is also apparently painless.

Diagnosis.—As already stated, the symptoms do not always indicate the precise locality in the bowels which is the seat of the inflammation, but *post-mortem* investigations show that in the vast majority of cases the lesion is either in the lower portion of the ileum or in the colon. The presence in the stools of glairy mucus, or of mucus tinged with blood, is pretty good evidence that the colon is principally involved. There is usually but little abdominal tenderness, and pain is either absent or causes but little complaint. Its presence or absence is no aid in diagnosis. The frequency of the stools and their admixture with mucus and blood; the presence of fever and vomiting; the attendant prostration; the gradual approach of serious symptoms, and the symptoms of indigestion which generally precede the bowel trouble by several days, are sufficient ordinarily to enable one to make a correct diagnosis.

Prognosis.—Entero-colitis is always a serious disease, but not by any means a necessarily fatal one. Many cases are met with, characterized by some gastro-intestinal symptoms, vomiting, high temperature, diarrhea, and nervous manifestations, which are convalescent in a few days, and make a quick and complete recovery. Other cases, and these are in the majority, drag along for an indefinite period and terminate after weeks or months, either fatally from exhaustion or from some complication, or make a slow or tedious recovery, after weeks or months of tardy convalescence. If the inflammatory condition results in follicular ulceration, the chances of recovery are very small. The diagnosis of follicular ulcers is difficult, and can only be made from taking the case as a whole. "If a delicate infant, which from time to time has been specially prone to diarrheal attacks, especially if it has had symptoms of a mild catarrh of the colon, has an attack which starts in with green mucus stools, and which continues with unabated severity for a week or ten days, with low fever, we think of acute follicular inflammation as certain and of ulceration as probable. If these

symptoms continue for weeks without intermission, the child all the time failing steadily in strength, the probability becomes almost a certainty.

"If, on the contrary, after three or four days of acute symptoms, there is improvement in the stools, and one occasionally quite fecal in character, and if after a few days another such exacerbation occurs, succeeded by another remission, and so on, we may be tolerably sure that no ulcers have yet formed."—*L. Emmet Holt, M. D.*

In cases of follicular ulceration, the temperature is apt to run comparatively low, the stomach is but little disturbed, and the course of the disease is slow and irregular.

The greatest danger in these cases arises from complication. During the hot months there is danger from cholera infantum, as a sequela. At any season of the year, there is constant danger of serous effusion taking place into the encephalon, producing spurious hydrocephalus. When this occurs or is threatened, there is soper alternating with extreme restlessness and a return of vomiting. Emesis occurring at a late stage of infantile diarrhea is always a bad prognostic sign.

Treatment.—The successful treatment of these cases necessitates a thorough knowledge of the producing causes, and the ability to improve the hygienic environment. A change of air from city to country is oftentimes a *sine qua non* of cure. These children must have plenty of fresh, pure air. If this can be had at home, well and good; but if not, no time should be lost in seeking the country.

If the baby is but a few months old and is being hand-fed, or if it has just been weaned, a return to the breast, if only temporarily, may be imperative. Where this is impracticable, some one of the "baby foods," either domestic or commercial, will have to be tried. All milk should be boiled and peptonized, so as to get rid of all curds. Barley-water will be found very useful with young infants. Raw-meat juice must not be forgotten.

As there is usually more or less thirst, fluids are eagerly taken, and with a little care the drink can be made nutritious as well as satisfying to the thirst. Toast-water and the bread jelly spoken of on page 56 are good. As the appetite is slight and precarious, a frequent change in aliment is required. Milk, if properly prepared and fresh, is all right, if it can be digested. Children over a year old often take koumiss with avidity, and there is no milk preparation so easily digested. It satisfies thirst while affording much nutriment.

If the measures, already prescribed, fail, we may still find a successful pabulum in the yolk of a hard-boiled egg—boiled so

long that the yolk is mealy—or wine whey, of which the child may take considerable quantities without detriment. Dr. Meigs advises, in some cases, the white of an egg stirred in a small glass of water, which, he says, the child will usually drink without recognizing the presence of the albumen, "and we are thus enabled to administer a considerable amount of nutritious food, by giving the whites of two or three eggs in the course of the day."

Great care must be taken, even during convalescence, not to overtax the digestive powers.

The rule for feeding should be "little and often," rather than much at a time.

Local measures are of very great value in these cases, and should never be neglected. The main seat of the inflammation is, as we have seen, more often than otherwise, in the colon and in the lower half of it, sometimes being confined to the sigmoid flexure. When this is the case, nothing but good can come from flushing out the bowels with hot water, containing some soothing alkali, such as borax. It cleanses the gut of all offending matter, soothes the irritation of the mucous membrane, and acts as an astringent to the congested circulation. When used for their local effect, the enemata may consist of from two to four ounces of water as hot as can be well borne, into which has been dissolved a third of a teaspoonful of powdered borax. This may be given once or twice daily or even oftener. Where the inflammation is high up in the colon, the whole viscus may be irrigated. This is accomplished by inserting a large-sized flexible catheter or rubber rectal tube and carrying it through and beyond the sigmoid flexure, so as to reach as near as possible the ileo-cecal valve. In this way the whole colon can be flushed. At least a gallon of water is necessary, into which half an ounce of borax should be dissolved. Hamamelis (witch hazel) may be used to advantage in some cases instead of borax, especially when there is either fresh blood in the stools or when the discharges contain considerable quantities of inspissated mucus. The hamamelis may be used in the proportion of one part to eight of water. A large-barreled, hard-rubber syringe may be used to force the injection, or, still better, a fountain syringe, the bag of which should be held a few feet above the patient. When irrigation is used, once a day is often enough to repeat it.

Moist and hot applications to the exterior of the abdomen are also useful. These may be applied in the form of fomentations, *i. e.*, cloths wrung out of hot water and covered with oiled-silk or rubber cloth, or in the form of a poultice made with ground flaxseed stirred up with boiling water. The poul-

tice should be spread on cheese-cloth and applied as hot as can be borne without discomfort. When cool it should be renewed. These measures, simple as they are, are of great benefit and are indorsed by the highest authorities both of Europe and this country.

Medicinal Treatment.—There is scarcely any other affection that requires such close discrimination as this in the selection of the appropriate remedies. The disease itself is inclined to be kaleidoscopic. Its features are subject to frequent changes, while the stools are of almost infinite variety. There are, however, associated symptoms, which, taken together—and they must be so taken—give one a picture of the remedy, if we take the trouble to go deep enough into their differential significance. There is no specific for this affection, and rarely a single remedy that will cover the totality of the symptoms. The character of the stool is but one of the many guides to the selection of a drug in a given case; every trifling element which goes to make up this character should be studied—the color, odor, form, consistency, frequency, are all of them important. Then the mental condition of the patient should be considered, whether apathetic or irritable; the general state, whether cachectic or otherwise. Only by a close and exhaustive scrutiny, and a careful weighing of each particular symptom, is it possible to meet the indications and requirements of the particular case in hand. Sometimes so trifling a symptom as the time of aggravation, whether morning, noon or night, furnishes the key to the whole case. More than once, when three or four different remedies seemed to be equally called for, the choice has been made by the help of so trifling a differential point as vomiting *without* thirst. (Antimon. crud.)

IN SIMPLE DIARRHEA the remedies most generally called for are as follows:

Antimonium Crud.—Stool watery, often profuse, alternating with constipation; tongue coated white; no thirst; worse at night and early in the morning; cutting pains before stool; prolapsus ani; child cannot bear to be touched or looked at. Violent vomiting excited by taking food or drink.

Belladonna.—Stools thin with green mucus, bloody mucus, granular, yellow, slimy mucus; watery; worse in the afternoon and after sleeping; colic; tenesmus after stool; head hot; easily startled; rolling head from side to side; delirium during sleep or just after stupor; lethargy with flushed face; children cry much and are very cross; tongue dry and red at the tip; sleeps with mouth open; constant chewing; aversion to food; partial or general spasms, with unconsciousness; involuntary urination; abdomen distended and tender; dry heat; quick,

hard, small pulse; sleepiness with restlessness. Characteristics: drowsiness, with startings, dry heat, and frequent drinking.

Bryonia.—Stools brown, thin, fecal, undigested, frequent, involuntary during sleep, smelling like rotten cheese; worse in the morning in hot weather; often suppression of exanthemata; nausea after sitting up; worse from motion; desire to get out of bed; desire for things which are refused when offered.

Chamomilla.—Stools green mucus; mixed green and white mucus, like chopped spinach; slimy mucus; scalding, frequent, smelling like rotten eggs; worse during dentition; diarrhea following a cold; colic during stool; peevishness—children cry much and can only be pacified by being carried about; tongue and mouth dry; moaning in sleep. Best given in recent attacks; benefit of short duration.

Colocynthis. — Stools saffron yellow; frothy, liquid; first watery and mucus, then bilious and lastly bloody, thin, greenish, slimy and watery; worse after eating and during dentition; cutting colic; great urging; tongue coated white or yellow; much thirst; nausea lasting until falling asleep and returning after waking; severe colicky pains are characteristic.

Croton Tig.—Stools yellow, watery, which come out like a shot; worse after drinking and while nursing; constant urging to stool; dry parched lips; excessive nausea. The three highly characteristic symptoms of croton tig. are the yellow, watery stools, sudden expulsion, and aggravation from eating and drinking.

Nux Vomica.—Stools thin, brownish mucus; thin, bloody mucus; frequent, small; after drastic medicines or prolonged drugging; violent tenesmus; tongue coated thick; pale, earthy color of face; gums swollen, bleeding; bad smell from the mouth; thirst; loss of appetite; frequent but ineffectual efforts to urinate; debility; jaundice; much gas in stomach and bowels.

Podophyllin. — Stools watery, greenish watery; jelly-like mucus, chalk-like, fecal; profuse, frequent, gushing, painless; very offensive, like carrion; worse in the morning and at night, worse after eating or drinking; prolapsus ani; rolling of the head during dentition; bad breath; tongue dry and coated yellowish or white; gagging or empty retching; sallowness of skin; jaundice characteristics. The stools are profuse and gushing, each seeming to drain the patient dry. There may be also violent cramps; changeable stools with meal-like sediment.

Sulphur.—Stools watery, frothy, fetid, slimy, excoriating, involuntary; worse in early morning, after taking milk, after suppressed eruptions, during dentition; open fontanels; sleeping with eyes half open; wakefulness. The early morning exacerbation is very characteristic.

ENTERO-COLITIS—*Aconite.*—Stools watery, bloody, slimy mucus, small, frequent; tenesmus; restlessness; won't be covered up; lips dry and parched; unquenchable thirst; nausea, vomiting; violent pains in abdomen; full, hard, very quick pulse; dry, hot skin. Only useful in beginning of acute cases.

Arsenicum.—Stools thick, dark-green mucus, frequent, scanty, corrosive, offensive, worse at night and after eating or drinking; worse after midnight; great restlessness, constantly changing place; violent, unappeasable thirst; vomiting after eating or drinking; dry heat; great prostration; rapid exhaustion; emaciation; very rapid and weak pulse; diarrhea generally painless. The two characteristics of ars. are thirst and restlessness.

Ipecac.—Stools green mucus, grass-green, bloody, fermented; worse at night and during dentition; face pale; no thirst; great nausea; flatulent colic; spasms; sleeps with eyes half open. Continuous nausea is the most characteristic symptom of ipecac.

Iris. Vers.—Stools watery, greenish, undigested; tenesmus; vomiting of ingesta and of bile; vomiting of sour fluid; vomiting of sour-smelling milk in children.

Merc. Sol. or *Vivus.*—Stools green mucus, bloody mucus, green, slimy, bloody, frequent scanty, corrosive; worse at night and in very hot weather; violent and frequent urging before stool; nausea; chilliness; pinching and cutting colic; open fontanels; large head; gums swollen and bleed easily; tongue swollen, soft and flabby; impressions of teeth on tongue; tongue coated white or yellowish; increase of saliva or intense ptyalism; violent thirst; frequent desire to urinate; restless sleep; sour-smelling perspiration; jaundice. All symptoms intense.

Pulsatilla.—Stools greenish, bilious, watery, offensive, corrosive, involuntary; worse at night; after measles; after cold drinks; rumbling in bowels before stool; bad smell from mouth; saliva increased; flatulent colic; aversion to fat, to meat, to bread, to milk.

Rheum.—Stools mucus and fecal, sour-smelling, fetid; worse after eating; worse during dentition; before stool, colic and urging; restless; demanding things with vehemence and crying; desire for various kinds of food which become repugnant as soon as tasted; restless sleep with tossing about, crying out, and twitching of muscles of the face and hands (bell.); sour smell of the whole body. This last symptom is very characteristic.

Rhus Tox.—Stools watery, thin red mucus, thin yellow mucus, bloody; involuntary—especially at night while sleep-

ing; fetid, frothy, painless and odorless; relieved by bending double and when lying on the abdomen; better from warmth and from continued motion; cutting colic; urging; nausea; restlessness; pale, sunken face with blue rings around the eyes; tongue dry, red or brown and cracked; increase of saliva; loss of appetite; much thirst, which is worse at night; thirst for cold drinks, especially for milk, which is taken greedily; troublesome dreams of vivid character—of hard work and difficulty. This craving for cold drinks and the laborious dreams are very characteristic.

CHOLERA INFANTUM.—Cholera infantum or cholerine is the most serious, although by no means the most common, of the diarrheal diseases of early life. Like entero-colitis, it is essentially a disease of the city, and is found in the alleys rather than on the avenues. It is most prevalent during the "heated term," although I have seen two fatal cases in this city, as early as April. Its onset is sometimes sudden and without premonitory symptoms. This, however, is the exception. More often there is a preceding diarrhea lasting from a few days to a week or more. This prodromal diarrhea is usually of mild type and attracts but little attention. The disease itself is encountered most frequently in infants under eighteen months of age, and the majority of cases are under a year old.

Symptoms.—The development of choleraic symptoms is sudden and frequently of such severity that the case terminates fatally in a few hours. The two essential features of the disease are vomiting and purging, and either of these symptoms may precede the other or both may appear simultaneously. The vomiting is persistent and incessant. The vomited matter consists at first of whatever food has been recently taken and, after this has been ejected, of serum, mucus and bile. The thirst is unappeasable, and yet whatever is taken into the stomach, whether food or drink, is instantly thrown up again. At the very commencement of the disease the temperature rises, and in fatal cases may speedily reach as high as 105° Fahr. or even higher. In milder and hopeful cases, the thermometer does not register above 102° or 103° Fahr. when taken per rectum. In fatal attacks, the temperature has been known to rise just before death as high as 108°. Either of the temperatures mentioned may be present while the surface of the body feels cool to the touch, with a clammy skin and cold extremities. The stools are frequent, large and watery. At first the discharges contain traces of fecal matters and mucus, especially if the attack has been preceded by gastro-intestinal irritation, but quickly changes to the appearance of dirty water. Still later the passages lose

all color and become altogether serous in character. They are frequently so thin and copious as to soak through the napkin and saturate the bed.

As they lose color they gain proportionately in odor, the smell being in some cases overpowering. Occasionally, however, cases are met with in which the stools are odorless. In some attacks as many as twelve or fifteen stools may occur in half a day. With this copious loss of fluids there is corresponding loss of weight and strength. There is no other disease of childhood in which this feature is so marked. Baginsky records a case in which the loss of weight was three pounds in two days. From the beginning the general prostration is great.

The fontanels are depressed; the face becomes pale and pinched, and the eyes are sunken in their sockets. There is at first great restlessness, with cries and moans, and the features express the greatest anxiety. As the disease progresses, this condition gives way to one of apathy or stupor. The pulse is always accelerated and may beat as fast as 150 or 200 in the minute. The respirations are somewhat quickened from exhaustion, but are otherwise normal. The urine is scant on account of the great loss of fluids through the bowels. Notwithstanding the severity of other symptoms, the infant does not seem to experience any abdominal pain or tenderness. In fatal cases, the vomiting—and sometimes the diarrhea also—ceases for some time before death, which is foreshadowed by the absent pulse, the hyperpyrexia, the cold and clammy skin; by stupor, coma and convulsions. In contradistinction with such cases as these, some infants pass into a state of collapse, which is indicated by sub-normal temperature, pinched features and cold breath. When these symptoms are present, death is not far away.

The duration of cholera infantum depends largely upon the severity of the attack. In some cases death takes place in a few hours. In others, which terminate fatally, life is prolonged for several days. In cases which recover, the severe symptoms which we have just described rarely last for more than a day, before signs of improvement are visible. The cessation of vomiting is generally the first of these hopeful signs, after which the stools become less frequent and contain more solid matter. The color of the discharges becomes more normal. The temperature falls and the child becomes less nervous. Restful sleep is a symptom of the most favorable character. The diarrhea now partakes more of a catarrhal character, and this may continue for a week or more. Relapses are not uncommon, and even after all signs of improvement have continued for several days, the choleraic discharges return with generally fatal results. In

other cases a diarrhea, precisely like that of severe entero-colitis, supervenes. The serous discharges cease and are replaced by those of a brown, gray or greenish color, containing mucus and undigested food, and are more or less offensive. There is a return of appetite and a more restful condition. Some fever continues and there is a persistent though less rapid loss of flesh. These symptoms, with exacerbations and remissions, may continue for an indefinite time before convalescence is firmly established.

Diagnosis.—There is usually no difficulty in diagnosticating this disease. The frequent and profuse discharges, which rapidly lose all color as well as consistence; the incessant vomiting and inordinate thirst; the rapid emaciation, which in well-marked cases seems to progress visibly under your very eye; the pallid and anxious countenance; the extreme nervousness; the rapid rise in temperature—these are symptoms which attend no other disease and stamp its character as plainly and as clearly as symptoms can. True Asiatic cholera is the only affection with which it is possible to confound it, and when this is prevalent, the differential diagnosis is difficult, if not impossible.

Prognosis.—Age, season of year, previous physical condition, environment, all tend to modify the prognosis in cholera infantum. The younger the infant, the more rapid is the exhaustion, and the less is the vital resistance to the shock of the disease; the more humid and hot the atmosphere, the less help can we expect from the eliminating function of the skin. The violence exhibited by the early symptoms, is generally continued throughout the attack, and when this is extreme, the strongest constitution is frequently unable to withstand it. There are cases that are fatal from the beginning, and no treatment, however skillful or prompt, is of any avail. This fact should not discourage the physician from employing all of his resources, and from hoping for good results, even under the most adverse circumstances. The symptoms that are especially perilous are uncontrollable vomiting; a body temperature exceeding 106° or 107° Fahr., or a sub-normal temperature of sudden development; profound nervous depression, as indicated by stupor or coma. Favorable symptoms are a falling temperature, if it has been previously abnormally high; or a rising one, if it has been sub-normal; quiet sleep, if accompanied by an improvement in the pulse and cutaneous circulation is of the best augury. While the symptoms may be such as to necessitate a guarded prognosis in a given case, there are no cases so grave that the physician may not console himself and the friends with that maxim which should never be forgotten

or ignored, in treating the affections of infants and children, "While there is life, there is hope."

Treatment.—There are two requisites in the successful treatment of cases of cholera infantum, which must ever be borne in mind, viz., *warmth* and *stimulation.* The first can be secured by the use of hot-water bags or bottles, distributed about the patient, in addition to swathing the body in hot flannels. The second necessity of the case can be best accomplished by hot-water enemata. For this purpose the water used should be small in quantity and as hot as can well be borne. In case the stomach is more intolerant than the rectum, the latter may be used for purposes of medication, the indicated remedy being added to each enema. In the early stage of the disease the tongue is usually moist, and medicine may be given on the tongue dry, with less danger of exciting vomiting than when given in liquid form and swallowed. To allay the burning thirst, a piece of ice, wrapped in a piece of linen, may be given the child to suck. Water should be given very sparingly, if at all. Champagne is sometimes retained and may be useful, but better still is a little hot water with a few drops of brandy or whisky added. Koumiss given cold, is generally taken with avidity on account of the thirst. Raw-meat juice is especially valuable by reason of the concentrated character of its nutritive qualities.

As soon as convalescence is established, its progress may be hastened by daily inunctions of oil. For this purpose, plain olive oil may be used, or, if preferred, cod-liver oil. My friend, Dr. N. F. Cooke, now deceased, used to advocate the use of a hot bath of chicken-broth, followed by an inunction of the skin with cocoa butter, scented with a little almond oil. Some of the leading druggists here in the city keep this prepared and dispense it under the name "Unguentum Græcorum." Camphor stupes applied over the abdomen are recommended by some as being both stimulant and soothing in their effect.

During convalescence, hygienic treatment is of the utmost value. A change of air, either to the seashore or the mountains, will prove most advantageous. A short trip into the country will be beneficial; but a journey by boat, even on fresh water, where the air is cool and invigorating, is still more so.

Medicinal Treatment.—The first remedy to be thought of in these cases is:

Veratrum Alb.—It is indicated by the profuse and watery stools; the incessant vomiting; the cold and clammy condition of the skin; by the sudden onset of the attack; by the great thirst which only provokes further emesis, and by the great

prostration which threatens collapse. The tongue is cold, the pulse almost imperceptible and the countenance hippocratic.

Arsenicum.—Stools green, watery, offensive; vomiting immediately after anything is swallowed; great thirst, but no satisfaction from drinking; great restlessness and irritability; cold extremities; distended and tympanitic abdomen, or abdomen retracted and wrinkled.

Cuprum.—Stools green and painful; retching; violent but ineffectual efforts to vomit. Especially indicated where there is a tendency to convulsions from the beginning; hydrocephaloid condition; stools frequent, but not very copious; eyes deeply sunken with blue rings around them; violent colic and cramps; cramps in the legs and feet; general convulsions, with continued vomiting and violent colic.

Camphor.—Great prostration with little or no vomiting and purging; coldness with threatened collapse; attack very sudden; face pale, livid, purple; upper lip drawn up exposing the teeth; foam at the mouth; eyes sunken and fixed; cold sweat on the face; great sinking and collapse, sometimes without stool.

Ipecac.—Nausea and vomiting predominate; stools green as grass, or fermented like yeast; face pale and sunken; flatulent colic; sleeps with eyes half open.

Argentum Nitrate.—Stools green mucus, frequent and fetid; painless, accompanied with much noisy flatus; burning in stomach; child cries for sugar and will take nothing else; nausea, with loud eructations; chilliness. The principal characteristic of this remedy is, that it occurs in children inordinately fond of sugar and sweet things, and who clamor for them even when sick.

See also podophyllin, ferrum phos., kreasote, phosphorus, tartar emetic, ethusa, secale corn. and phosphoric acid.

DYSENTERY.

This disease, which is often referred to as "bloody flux," is so much more common to adults than to children that it scarcely deserves a place in a work like this. A few words, however, on the subject may not be out of place, since the disease, while rare, is occasionally met with in infancy and childhood. When it does thus occur, it is almost always in combination with one or the other affections already described. In very rare cases, however, it may occur idiopathically, and when it does so it has all the symptoms and characteristics which appertain to it in the adult.

It affects principally the rectum and lower portion of the

colon, the mucous membrane of which becoming inflamed or ulcerated, gives rise to pain, tenesmus and passages of a muco-purulent character. It is an acute febrile disease, usually of short duration, and is sometimes met with as an epidemic extending over large districts. In some portions of the country it is said to be endemic. It is more often sporadic, and may follow measles as a sequela. According to Condie, a few days of cool, rainy weather occurring in the summer, will often cause the prevailing bowel complaints of children to assume a dysenteric character. It is extremely rare in early infancy and never occurs in children at the breast. The onset is sometimes abrupt and sometimes gradual. In the former case the temperature may quickly rise to 104° or 105° Fahr., while in the latter there may be no elevation of temperature whatever. There may be severe nervous disturbance with delirium, but no vomiting, as a rule. The discharges consist of almost pure mucus or mucus streaked with blood, and sometimes of pure blood. There is considerable tenesmus, which is accompanied with griping pain. The stools are small and frequent, sometimes as often as every half-hour. When this is the case, the loss of body weight and prostration are rapid and sometimes extreme. Prolapsus ani, as a result from straining, is not uncommon. The disease in sub-acute cases is very apt to assume after a time the symptoms of an ordinary entero-colitis and run a slow and indefinite course, attended by frequent relapses and an uncertain outcome.

Symptoms.—These are sometimes so similar to those already described under the head of entero-colitis that there is difficulty in some cases of making a satisfactory differential diagnosis. Ordinarily, however, the affection is readily recognized. The absence of vomiting is marked. There is more pain, and the pain is accompanied with uncontrollable tenesmus. The discharges, after the first one or two, cease to be fecal and are mucus or consist of blood and mucus. The fever is less high and there is but little thirst.

The prognosis is usually good, except in cases of broken health from other causes, and where the disease sets in with exceptional violence.

Treatment.—But little need be said regarding treatment in addition to that given to other forms of bowel trouble. The same hygienic and auxiliary measures already advocated are equally admissible here. The remedies whose characteristics have already been given may also be consulted. The two following remedies, however, have a special application to dysentery, and when indicated will be found of great value.

Mercurius Cor.—Stools consist almost wholly of blood; urine hot, scalding, bloody, scanty or suppressed; much vesical tenesmus.

Rhus Tox.—The stools are mucus rather than bloody, and often assume an appearance like the scrapings of raw beef; involuntary stools; pains in abdomen and limbs are worse when patient is quiet and better from moving about; worse at night and particularly after midnight.

CHAPTER V.

CONSTIPATION.

Definition.—The terms diarrhea and constipation are only used relatively by intelligent people. During infancy and childhood, the number of daily evacuations from the bowels differs with different children and varies considerably in the same child. This difference may be quite marked without being in any sense pathological; but when there is an interval of twenty-four hours between evacuations in an infant under three months of age, or a much longer interval than this in older children, a constipated condition may be said to exist. In early life the digestive function is much more active than at a later period, and the digestive process is not complete until the egesta are duly and naturally expelled. The alimentary canal is the great sewer of the body, and upon its permeability and normal activity depend the health of the entire organism. A mechanical closure of the bowel, whether congenital or acquired, is always inimical to life. With cases of imperfect bowel or mechanical obstruction of accidental cause, we have nothing to do, since they are treated of in works on surgery. It is with cases of functional deficiency or inefficiency, by reason of which the bowels fail to act with normal and necessary frequency, that we have here to deal.

Frequency.—The fact that diarrhea is so very common in early life would lead one naturally to infer that constipation—its opposite—would be equally common. But such is by no means the case. In our own experience, it is very uncommon indeed, and when it does occur, it is so obviously due to errors in diet, that all the treatment that is usually necessary is to change the diet, to effect a cure. Our own experience, however, is evidently exceptional, for nearly all writers on Pedology assert that constipation is very frequent among children. The physiological action of the colon—which is the portion of the bowel chiefly involved in constipation—requires a certain amount of stimulus which comes from fecal accumulation. This fecal accumulation is partly the refuse products of digestion, and partly the effete matters which come from incessant tissue waste. Constipation results when the peristaltic action

of the bowel fails to carry along these matters to their natural outlet. Such a condition may be due to atony of the bowel, which follows over-stimulation from too coarse food or the use of purgative medicines. The first effect of such food or medicine is to produce what might be styled a traumatic diarrhea, and the reactive or secondary effect is constipation. It ought not to be necessary to say—certainly not to students and practitioners of homeopathy—that purgatives and laxatives should *never* be given to children to relieve functional disturbance of the bowels. The most obstinate cases of constipation that come under the physician's care are of this kind. Castor oil, castoria, calomel, rhubarb, and all that class of remedies for constipation should be relegated to the past. They are worse than useless, for the more they are taken, the more will they be needed. Even old-school authorities have learned better than to advocate them. When a condition of atony exists, such as is here indicated, no matter how it has been produced, more or less impaction of the colon is the result, and the stools when ultimately voided are dry, hard and painful.

One of the chief causes of constipation in infancy is the lack of sufficient fluid in the system. The food is given too thick or too little drink is given in addition to the food. Infants often cry from thirst when their desire is mistaken for hunger. When too young to talk or express their wants, drink should be offered to them several times daily. It will often be found more acceptable than food. Another of the causes of constipation in infancy is deficient intestinal secretion, due to glandular inactivity or to some fault of the mucous membrane itself. In either case the result is the same. Deficiency of bile causes fermentation and fills the bowels with gas, which in time causes a *quasi* paralytic condition of the bowels from distension. All quieting medicines, such as soothing syrups, cordials, etc., contain some form of opium, which is always constipating and should never be used in the nursery, if for no other reason than this. Certain diseases of the nervous system are well known to be attended by constipation as one of their prominent symptoms. Thus meningitis, myelitis and hydrocephalus are diagnosticated. "The bowels are sluggish in all diseases of the cerebro-spinal system, due in part to the interruptions in the motor nerve-currents, or to a state of tonic contraction in the abdominal and intestinal structures." In all cases where no movement of the bowels occurs soon after birth—say within twenty-four or thirty-six hours—the anus should be inspected to ascertain if it be pervious or not.

In nurslings, after excluding congenital defects, we should look to the mother for the cause of constipation. If she is of

constipated habit, that should be corrected and her diet be so arranged as to ensure a regular daily stool.

Treatment.—Only in exceptional cases are medicines or drugs necessary to cure constipation in infancy. Immediate relief can nearly always be secured by the use of warm-water enemata. These need not be large for young infants. Usually two to four fluidrachms are sufficient. Their efficiency is increased by the addition of glycerine in the proportion of one-half glycerine to one-half water. Suppositories of soap, gluten, or glycerine are also useful and when judiciously employed do no possible harm. They generally produce an immediate action and should therefore be used at the time when the child has previously had its habitual stool. Regularity in the action of the bowels is very essential. Many cases of constipation are due entirely to carelessness. The bowels can be educated, with a little care, to act with the regularity of clockwork. As soon as a child is able to walk alone, or even earlier, it should be taught to expect an evacuation of the bowels at a certain time of day, and when this time comes it should be placed on a chair suitable for the purpose. Nothing should be allowed to interfere with this regularity of habit. Older children may establish the habit, even when the bowels are sluggish and irregular, by drinking a glass of cold water a little time before a stool is desired.

Excess of water, *i. e.*, more than is needed by the system to maintain the secretions and the due fluidity of the blood, when taken into the stomach does not enter the general circulation or pass off by the kidneys, but goes into the bowels to moisten the excreta and facilitate their expulsion.

Massage of the abdomen is also useful and may be employed with infants of any age. In obstinate cases, where such measures as have been suggested prove inadequate, electricity will be found helpful. The faradic current is the one we have mostly employed.

The main dependence, however, in the treatment of constipation should be on diet. This should depend on the age of the child, but in all cases should consist of food of coarser quality than required or admissible under other circumstances. Starchy foods should be avoided for reasons already given. Concentrated aliment, such as eggs and cheese, are very constipating in their nature. For children over two years of age, oatmeal with a little molasses on it may be given, and this may be changed to mush made of entire wheat or unbolted flour, or corn meal. Stewed fruits or baked apples are laxative and may be given to children who are having a mixed diet.

For bottle-fed infants there is no food so well adapted for

regulating the bowels as Liebig's dextrinized food. This is a food prepared, as we have before stated, from wheat flour mixed with malted barley. Under heat, the starch of these cereals is transformed into glucose, which has decided laxative properties, especially when administered without milk. This is one of the reasons, and the principal one, why we are so partial to Mellin's food for infants. It is prepared after the Liebig formula, and by varying the proportions of milk, when preparing it for a meal, it can be made laxative or otherwise at pleasure. Prepared with water or cream, it can be given freely to a constipated infant with good effect; but when the bowels are sufficiently loose, it should be mixed with boiled milk in due proportion, and with a little experience and judgment the evacuations can be regulated to a nicety. A pure milk diet—that is, consisting of cow's milk exclusively—is almost certain to result in constipation sooner or later.

Post-mortem examinations of the intestines of milk-fed infants often show the colon coated on its inner surface almost to occlusion with undigested or partially digested casein, which has been accumulating in this locality for an indefinite period. For this reason it is well to occasionally give to infants at the breast, if constipated, an occasional feeding of thin Mellin's food, which acts as a diastase on the casein and carries forward the digestive process, in such cases as those just mentioned, to perfect completion.

It seems superfluous, after what has been already said about the success of hygienic and prophylactic treatment in constipation, to add anything in the way of medication. But sometimes there are concomitant symptoms that require attention, and medicines may afford relief in cases in which a change of diet may effect a permanent cure. The following remedies may be consulted:

Bryonia.—The stools are very dry, as if burnt, and of a dark color; alternation of constipation with diarrhea; soreness of stomach and head; dry lips and mouth.

Graphites.—The stools are of an uncommon size, very large, and the child has more or less humid eruption over the body, behind the ears, on the face, or in the groins.

Nux Vomica.—This is the chief remedy for constipation, and is especially valuable in the gastric derangement, which oftentimes accompanies it. In cases where it is indicated, the stools are large and difficult; they are dry and hard, or small, frequent and painful; much colic.

A somewhat empirical practice, but one indorsed by successful experience, is to give sulphur at night and nux vomica in the morning.

COLIC: ENTERALGIA.—By giving a paragraph to this affection, it is not intended to dignify it with the title of disease, for such it is not. It is never more than a symptom, and yet the pain which accompanies it, may be so severe as to cause convulsions or even death. It is very frequent during the first few months of life, and may be produced by causes so trifling that their nature may elude the closest investigation.

Some children seem to have been born colicky, for, do what you will, the paroxysms recur again and again. As a rule, however, colic is a result of indigestion and is a common result of constipation. This is not always the case, for enteric colic may be present when the bowels are regular or more frequent than natural. There is a prevalent idea that certain articles of food partaken of by the mother tend to produce colic in the nursing infant, and there seems to be good ground for this belief. These foods are mainly acid fruits and certain vegetables, well known to produce flatulence when taken into the average stomach. Theoretically, when vegetable acids are taken up by the blood, they are converted into carbonic acid, which speedily combines with soda and potassa to form alkaline carbonates. Physiological chemistry teaches that this is their ultimate goal, and teaches it without qualification or reservation.

In a perfectly healthy organization, with digestion quite up to the physiological standard, this is doubtless true, and when it is true, acids may be eaten by a nursing woman without fear of being disturbed by colic in her nursling, for long before these acids could reach the milk glands their acidity would be destroyed.

But perfect digestion is not always enjoyed by the mother or nurse, and the best regulated digestion will sometimes go wrong, in which case the fruit acids may not be entirely transformed into alkaline carbonates, but reach the breasts in an unchanged or partially changed form, and colic may be the result.

Experience is the best guide, and a nursing woman should avoid those articles of diet that she feels uncertain about digesting easily. If any particular food gives her infant colic, she should thereafter abstain from it, whether she craves it or not. There are other articles in plenty, that she may eat as a substitute, about which there can be no question.

When colic does occur it is usually indicative of disordered digestion, for it is rarely present when digestion and assimilation are carried on properly. This is clearly demonstrated by the character of the stools, which are usually, under these circumstances, either green and accompanied with mucus or filled with small masses of undigested curd.

In older children, colic is often caused by eating unripe or

indigestible fruit, such as green apples or gooseberries, or drinking large quantities of cold water when the stomach is empty, or the body overheated. Worms in the bowels, or intestinal obstruction from any cause, are capable of causing the disorder.

The causes of colic are so various, and cover so wide a range of danger—from a trifling and transient flatus to intussusception—that it should never be treated lightly or carelessly. In most cases the affection is paroxysmal, easily palliated, and unattended with peril. Its victims, although in an agony of pain while the paroxysm lasts, grow and thrive as if entirely well. In some families with a large number of children, it is so uniform in the experience of each child as to seem like a matter of inheritance.

In these cases, no changes in the food supply seem to make any special difference in the frequency or severity of the attacks, and the inevitable conclusion is reached, that the trouble is neurotic, being devoid of fever, tenderness or other evidences of inflammation. It is a mild neuralgia of the intestinal tunics and as such may be periodical in its visitations.

Infants who are prone to have colic usually develop the tendency during the first few days or weeks of life, and such cases continue to suffer at intervals until the process of teething is well advanced, or until the age of eight or nine months is reached. If the first month of infantile life is passed without colic, the exemption is usually permanent, except as due to dietetic irregularities or excess.

Symptoms.—Attacks of colic usually begin suddenly and may even awaken the infant out of a sound sleep. The child draws up the legs and instinctively bends the body forward to relax the abdominal muscles. There is violent alternate flexing and straightening of the lower extremities, tossing and contortion of the entire body, thrusting the clenched fists into the mouth. There is usually more or less flatulence, but the suffering may be intense, without any distension whatever, and even with retraction of the umbilicus.

Sometimes temporary relief is experienced by laying the child across the lap, producing steady pressure over the abdomen; while at other times the child seems to feel relief from being jumped up and down, which probably moves the gas about from place to place. When the abdomen is distended with flatus, it is not equally so; it may be conical along the center, and the small intestines be more involved than the colon; but more often the seat of disturbance seems to be in the large bowel, and the pain is in the direction of the transverse colon. In addition to the symptoms just enumerated, the child shrieks out with pain, the angles of the mouth are drawn

down and the face is pitiable to see. Syncope and convulsions may happen in severe cases. The paroxysms may last from a few minutes to several hours, and may recur at stated periods for days together. The appetite is oftentimes unimpaired and the child takes food eagerly or even greedily. It also sleeps well when not suffering from an attack.

Notwithstanding the torture which the child undergoes, its general health may not suffer in the least. It will grow strong and fat without showing the slightest evidence of general ill-health. The affection is to be distinguished from peritonitis and from inflammation of the bowels, by the suddenness of the attack, the violence of the pain, and the freedom from suffering between the paroxysms; by the quietude of the pulse, the absence of fever, and the relief obtained from pressure. Children will often, when pale with agony, throw themselves across a chair to obtain the relief which pressure affords.

Treatment.—Before active measures are instituted for the relief of supposed colic, it is always well to examine the infant's clothing, for many a case of enteralgia has been promptly relieved by finding a pin that had been piercing the infant's anatomy. The palliative measures that are mostly to be depended upon are enemas of hot water, hot fomentations applied to the abdomen, or the hot bath. A drink of hot water is also very serviceable. Gin and brandy are never required, and when given do more harm than good. The remedies which are more commonly called for are colocynthis, chamomilla and nux vomica, and their value is in the order named. In cases of great pain, coupled with obstinate constipation, plumbum will often afford prompt relief. Other remedies may be needed, but their selection will depend on concomitant symptoms that cannot here be anticipated.

CHAPTER VI.

INTESTINAL PARASITES.

WORMS.—Twenty-one different kinds of animal parasites have been found to inhabit the intestinal canal of man. Many of these, however, are of microscopical size and produce symptoms of such indefinite character that they are scarcely worthy of notice. Others, again, are only found in distant lands among savages or semi-civilized tribes, and are therefore only of interest to the helminthologist or the collector of medical curios. Only some seven varieties of intestinal worms are known to sustain a causative relation to certain pathological states, which give them special interest to the pedologist or the general practitioner of medicine. These are the ascaris lumbricoides, or round worm; the oxyuris vermiculosis, or thread worm; the bothriocephalus latus, and three species of tenia, or tape worms; and the trichocephalus dispar, or whip worms. The trichina spiralis is not included above because it rarely molests children.

Any of these parasites may exist for a time in the alimentary canal without giving rise to symptoms which are apt to attract notice. But some of them—any of them, indeed—may attain such size or multiply in such numbers as to prejudice health, if not to jeopardize life itself. In a general way it may be said that "worms" are by no means as common in the human cloaca as people commonly imagine. In opposition to current belief, they are comparatively rare. Not only is this true, but the human system is wonderfully tolerant of all forms of parasites, and harbors them undoubtedly in multitudes of cases, where their presence is never suspected and when no symptom of their existence is appreciable. This fact, however, does not prove the truth of the position assumed by some pathologists of the last century, that "these parasites exert a wholesome effect upon the economy and aid digestion by increasing the secretion of mucus and promoting the peristalsis of the intestine."*

On the other hand, they must be considered to be the occasional cause of serious derangement and possibly, in very rare instances, of death. A study of the life history of these para-

* Dr. C. W. Earl, in "Cyclopedia of Diseases of Children."

sites is necessary in order to know how to treat them successfully.

The ascaris lumbricoides, or round worm, bears a striking resemblance to the common earth-worm of the gardens, except being longer, whiter in color and more tapering at the extremities. The male is the smaller of the two sexes and is from four to six inches in length, while the female is from ten to twelve inches long. The body is firm and elastic and nearly transparent. The head is separated from the body by a circular depression, and has three small elevations, between which lie the teeth. When a female ascaris is subjected to slight pressure, the extended ovaries may be seen hanging from the ventral surface like a bundle of processes. The eggs are oval in form, about $\frac{1}{340}$ of an inch in length, and it has been estimated that a single individual may contain as many as sixty-four millions of them. These ova do not contain a formed embryo at the time of their discharge, but are almost indestructible and may remain dormant for a very long period. It is supposed that in this or in the larval state they are taken into the stomach by means of uncooked food or unfiltered water. The ascaris lumbricoides infests children between three and ten years of age. Its preferred habitat is the small intestine, but it is migratory in its nature and is prone to find its way into the large bowel and out through the anus. It also ascends to the stomach and even into the esophagus. It may penetrate the hepatic and pancreatic ducts, and in very rare cases, where the intestines have been perforated by ulceration, these worms in great numbers have been found in the cavity of the abdomen. They are rarely solitary like the tape worm, and yet, notwithstanding this great number of ova developed by the female, the number of mature ascarides is seldom over four or five.

The *oxyuris vermiculosis*, or seat worm, commonly known as the thread worm, or "pin worm," is the one most frequently found in early life. It varies in length from one to five lines, the female being twice as long as the male. There is a difference of opinion among authorities as to what part of the colon is the preferred home of this parasite, some holding that it is the cecum, while others—and the weight of evidence is in their favor—maintain that it is the rectum and the sigmoid flexure of the colon. It is whitish or semi-transparent in appearance. The eggs are oval, and each contains a formed embryo. They are introduced by the mouth and hatched in the stomach, from whence they pass onward to their habitat in the large intestine. They often crawl out of the anus and enter the vagina or urethra, or get under the prepuce. In either of the latter locations they produce the most intolerable

itching. They occur chiefly in young children, but no age is exempt from their presence. They propagate with great rapidity; and sometimes exist in such numbers that they line the intestine like fur. When they are so abundant as this, they are found above the illeo-cecal valve as well as below it, and are especially numerous in the appendix vermiformis.

The *trichocephalus dispar*, is of but little importance clinically, since it occurs but rarely in childhood, and it is not known that its presence produces any particular symptoms which are recognizable. It is found more commonly in the cecum and less often in the ileum and appendix vermiformis. It is sometimes called the whip worm from its shape, the posterior or thick portion of the female being bent or curved like the stock of a hunting whip, while that of the male is rolled in the spiral form. They are supposed to be introduced into the system by means of uncooked fruit and vegetables.

The *tape worms* are by no means as common as those just mentioned, although they are occasionally found in children of all ages, except nurslings. There are several varieties of tape worms, the *bothricephalus latus* being the largest. This worm attains a length of from fifteen to twenty-four feet, but is rarely found outside of Europe, and then it is chiefly met in countries bordering on inland lakes and seas, where the inhabitants live largely on fish. The two varieties most frequent in North America and Europe are the *tenia solium* and the *tenia saginata* or *medio canellata*. The latter is the beef tape worm; the former is the pork tape worm. The tape worm is an hermaphrodite, each segment containing the two sexual organs. The head or scolex is small, being about the size of a pin-head. The development of the worm proceeds from this head, segment after segment being produced by a sort of budding process. These segments are attached to each other at their extremities, and as they become further and further removed from the head, they become larger and more matured. When they have attained to full maturity, they are detached and enter upon an independent existence. Breaking the chain of segments does not compromise the life of the parasite. It continues the reproductive process by segmentation, and in time the former number of segments and the original length of the chain are restored. The mature segment, called proglottides, vary in size accordingly as they are in a state of contraction or relaxation. When relaxed, their length is about half an inch and breadth one-quarter of an inch. The genital organs are situated on the margin of each segment, a little posterior to the middle, and there is an alternation in their location between the right and left margins in the chain of segments. The uterus lies in the center of the segment,

forming a longitudinal straight line. Several branches are given off from each side of the uterus, and these divide and subdivide like the branches of a tree.

The male genital organs lie in the same aperture or pore in the margin of the segment with which the uterus and ovaries connect. Abnormal development of the parasite is very common. Sometimes two or more segments are fused together, and often they are stunted in their growth. Sometimes they contain holes, fissures and flaws, either from their original development or produced by rupture of the distended uterus.

The tenia solium is nearly always found alone, whence its name. The French call it *ver solitaire*.

At the top of the head of this parasite, there is a circle of hooklets, and back of this circle are four sucking disks, which the worm is able to protrude and move freely. When protruded they have the appearance of small tubercles with slender pedicles. The eggs of the tenia solium are globular, with a diameter of about $\frac{1}{130}$ of an inch, and with thick shells, which are striated "like mosaic work" by lines which cross each other. It is estimated that not less than 50,000,000 eggs are contained in all the segments of a mature worm.

The *tenia saginata*, called also the *medio canellata*, is much larger, stronger and thicker, both as regards the head and the segments, than the tenia solium. It is, however, not so long, usually measuring not to exceed eighteen feet. It is furnished with four strong sucking disks, like the tenia solium; but it lacks the circle of hooklets which characterize the latter. Instead of the hooklets, the head is furnished with a small frontal sucking disk. There is but little difference in the sexual apparatus of the two species, but the eggs of the saginata are larger than those of the solium and are oval in form. The former occurs over a much greater area of the earth's surface than the latter.

The other species of tenia do not differ from these named sufficiently to warrant a separate description. Their symptoms and treatment are precisely alike.

Etiology.—From what has already been said, it is evident that the cause of worms in children is due to the introduction into the system of either the ova or the larva of the worms themselves, and that when these have once found a lodgment within the system and a suitable soil for maintenance, they grow and propagate according to the fixed laws of their species, each finding its congenial habitat. Some species, such as the ascaris lumbricoides, do not develop directly from the egg into the adult form within the body of the ultimate bearer, but require the intermediate assistance of some invertebrate animal, as a

worm or the larva of an insect, in which the egg is matured, and after passing through certain necessary stages of metamorphosis and being discharged, are received into the human stomach in either the food or drink. In the country, where the drinking water is obtained from springs or shallow wells, it is very easy for the water to become contaminated by excreta and to convey ova or embryos into the stomachs of those who partake of it. Uncooked fruits and vegetables, such as salads, are also believed to be common mediums for their dissemination. A congenial soil is necessary, however, for their growth and development, and this is furnished when the vital powers are reduced or when the secretions are vitiated by disease. It has been frequently noticed that children in the last stages of continued fevers often pass lumbrici in their evacuations. Persistent indigestion, accompanied by irritation or inflammation of the mucous coat of the intestines, with excessive mucus secretion, predisposes to the generation or development of worms. Without this congenial soil, the ova or embryos may pass harmlessly through the alimentary canal without effecting a lodgement and of course without propagating. This accounts for the fact that some children are notoriously "wormy," while others are never thus troubled. Cleanliness has also much to do with the matter. Those who go unwashed and never clean their finger-nails, or who live in almost total disregard of sanitary requirements, are especially liable to worms.

Symptoms and Diagnosis.—All sorts of symptoms have at one time or another been ascribed to worms. They have mostly been nervous, such as convulsions, epilepsy, cramp, choreic movements, or nightmare, and have been supposed to be due to some reflex nervous discharge set going by the local irritation. But it is very doubtful whether any are of diagnostic importance. The presence of worms can only be diagnosed with certainty by finding them or their ova in the evacuations or about the anus. The habit of picking the nose is the popular indication, but it is often no indication at all. Pruritus ani is of more value, and when it is observed should always lead to a careful inspection of the feces, and even to the use of enemata with the view to detecting the worms themselves. Other symptoms, such as irregularity of pupils, discoloration round the eyes, tumidity of the abdomen with colicky pains, diarrhea, variability of appetite, etc., only need mention to show that they can have no special significance, although they may probably be some of the many symptoms of feeble health, impaired digestion, and irregularity of the bowels, which are often present where worms abound. The ascaris lumbricoides, however, inhabiting, as it does, the small intestine, and often in large numbers, is apt to

wander into the stomach, and is sometimes associated with very acute symptoms. Sudden attacks of fever and vomiting are apt to supervene, and to assume even an aspect of a bad form of gastritis or of severe cerebral disease. The round worms would seem to be particularly prone to induce convulsions. Nor need we wonder that such is the case, inhabiting the intestine, as they may do, by hundreds, and at a time of life when the nervous system has not yet reached the stable condition it assumes in healthy adult age. Dr. West has, however, seen very severe convulsions with thread worms, and other authors have equally noticed the liability to nerve disturbances which exist with the tape worm.

Thread worms, collecting in great numbers in the rectum, are apt to excite local irritation, mucus diarrhea, prolapsus ani, and the occasional passage of blood from the bowels. In the male they may excite priapism, and some of the symptoms of stone. Frequent micturition is a common symptom of their presence, and I have occasionally noticed hematuria also, and the uneasy sensations about the genital organs may induce the habit of masturbation.

In the female a purulent discharge from the vagina, due to worms that have migrated from the anus, is by no means uncommon. Worms of any kind are liable to occasion a mucus diarrhea, associated with a good deal of tenesmus.

Tape worms give rise to fewer local symptoms than either of the other varieties of parasites; but they are often associated with progessive and marked emaciation. In a general way, it may be said that there are no symptoms of worms that are pathognomonic—no symptoms, indeed, but may come equally well from any other cause producing irritation of the stomach and bowels. Only when worms pass from time to time, or when a microscopical examination of the feces has revealed the presence of ova, can we determine positively that the symptoms result from their presence.

An exception might be made to this statement in the case of pin worms—oxyuris vermiculosis. These worms can often be seen about the anus, when this orifice is subjected to close inspection. This is best done shortly after the child has gone to bed for the night. By placing the child on its elbows and knees, under a bright light, and spreading the buttocks widely apart, the worms, if present, will be seen wriggling about in the liveliest manner. Considerable expedition must be used, however, for as soon as the worms feel the cold air on exposure, they seek the folds of the anus, and are quickly out of sight.

Treatment.—It is scarcely necessary to point out to the intelligent student that in the treatment of intestinal parasites we

are not dealing with a simple disturbance of function, nor with any of the ordinary problems of pathology.

It would be the merest folly to treat the symptoms produced by worms, while leaving the worms themselves undisturbed. The question of remedies, then, is outside the pale of medical dogmas, and is purely one pertaining to toxicology. When treating a patient for worms, the homeopathic physician is compelled to lay aside his favorite shibboleth and accept the empirical treatment which has been born of necessity and cultured by experience. Much harm has been done by resorting too early to vermicides under a misinterpretation of symptoms, when a careful and tentative exhibition of the indicated homeopathic remedy would have been far better. Such remedies in proper attenuation should always be given first in the absence of unmistakable signs of worms, and after this, if the symptoms still persist, the appropriate anthelmintic should be given.

It should be borne in mind, however, that even after the parasites have been expelled, a condition of the system may remain that renders it possible for the worms to develop again, and this condition must be changed before a complete and radical cure can be looked for. In other words, it is not alone sufficient to remove the worms from the intestinal canal; we must in addition so alter the soil as to render it impossible for others to propagate.

Hahnemann was not the only one of the older writers who believed that a state of system favorable to the propagation of intestinal parasites was necessary to their production, and that that state or condition was removable by medicinal agents.

Brenner, who has the reputation of being the most celebrated helminthologist of his time, designated, under the name of diathesis verminosa, a condition of the alimentary canal accompanied by disorders of nutrition and digestion, in consequence of which material accumulated in the intestine which was favorable to the production of worms. It was even held by such distinguished investigators as Rilliet and Barthez that this worm diathesis could exist without the presence of worms.

Now, however, thanks to the exact scientific work done by patient investigators, accompanied by experiments on animals and man, the life history of most of the intestinal parasites, and the part which they play in the production of disease, have been put on a firm and scientific basis.

As the different varieties of worms require different remedies to effect their expulsion, we shall speak of them *seriatim.*

Ascaris Lumbricoides.—For these round worms our most efficient remedy is santonine, which is the active principle of cina, or artemisia santonica. It should be given in the evening at

bedtime, in doses of from one to three grains in powder, in the form of troches or capsules, or as it is nearly tasteless, it may be spread on bread-and-butter. It should be followed in the morning by castor oil or some other efficient laxative. Dr. Cowperthwaite says that he has secured all of the benefits of santonine by giving the first or second decimal trituration four times daily for three or four days. He states that when given in this way the drug does not produce its objectionable symptoms, viz., disturbed vision, red urine, etc., which so frequently follow the administration of large doses. It has been our own practice to combine with the santonine, as above indicated, a powder of the second decimal trituration of merc. cor. sub., which obviates the necessity of giving castor oil afterwards.

Spigelia, or pink root, is also an excellent vermicide, and may be given in doses of from ten to thirty minims, of the fluid extract. It is mostly used in an officinal preparation, combined with senna.

Cina.—This is the crude drug, artemisia santonica, of which santonine is the active principle. It is of all vermicides the most valuable, especially for the round and thread worms. It is also quite homeopathic to the existing morbid condition whose symptoms are usually attributed to worms, whether they are present or not, and will remove their symptoms while acting as a vermicide at the same time. Special indications for its exhibition will be given under the head of General Therapeutics, at the end of the chapter. It should be administered in drop doses of the tincture in a little water or on sugar every three or four hours.

Oxyuris Vermicularis.—For this variety of worms, medicines administered by the mouth are of but little account. As has been already pointed out, their habitat is in the rectum and about the anus. For this reason they are generally reached most effectually by means of injections. Common salt and water is oftentimes all that is necessary. Infusions of fresh garlic injected into the rectum for a few nights at bedtime we have found very effectual. If used under the physician's personal supervision, an enema of bichloride of mercury, in the strength of one grain to four ounces of water, is a sure cure. It should not be repeated, and should be followed after a few minutes by an injection of plain cold water. Anointing the anus, and the labia vaginæ when necessary, with sweet oil or vaseline, is of benefit.

Tape Worms.—In the treatment of tape worms, great patience and persistence are often necessary to secure the head. Unless this is secured the worm will grow again, necessitating

a repetition of the treatment. As it takes from ten to twelve weeks for the worm to develop its full length, it is often impossible to tell before this length of time has elapsed whether the treatment has been successful or not. It must be borne in mind that all of the remedies used for the expulsion of tape worms are more or less poisonous in their nature, and irritating to the stomach and bowels. They should never be used, therefore, without there is good and sufficient ground to believe them necessary.

Before administering the tenicide, the patient should be placed on a low diet for a few days, avoiding such articles of food as are digested in the small intestines, and only eating beef-tea, chicken-soup, milk, toast, or some light food which leaves little residuum. German physicians put their patients on a diet of onions, garlic and salt-herring, for the reason that these articles are known to be obnoxious to the worm. The medicine may then be administered, and after a few hours an active purgative given to expel the dead parasite. In case the head is not discharged, there is no certainty of the success of the treatment, but further means for its removal should not be employed until fragments of the worm are again discharged.

Male fern or *filix mas*, is the oldest and probably most popular tenicide. It is best administered in capsules containing one-half drachm of the ethereal extract. The oil may also be given in half-drachm doses, in mucilage with milk.

The bark of the *pomegranate root* (*Punica granatum*) is an excellent tenicide. The fresh bark only should be used. About one to one and a half ounces should be boiled in a pint and a half of water until the quantity is reduced one-half, this amount being taken in three doses within an hour.

Kückenmeister strongly advises the addition of ten or fifteen grains of the ethereal extract of male fern. The tannate and sulphate of pelletierin, the active principle of the pomegranate, have both been successfully used to remove the tape worm.

Kousso, the flowers and tops of *Brayera anthelmintica*, a tree of Abyssinia, a country where the tape worm abounds, is considered an effective tenicide, and is much used for the species there prevalent. It has also been used with success in Europe and America. It may be given in doses of from one to two drachms of the powder. Heller prefers to give it in compressed balls or disks coated with gelatine. He considers three drachms necessary for the tenia solium, and five drachms for the tenia saginata. The balls or disks should be placed on the back part of the tongue and swallowed alone, or by the aid of some coffee. After this, the tendency to vomiting should be resisted, with the assistance of lemon-juice, bits of ice swallowed, and by

maintaining the recumbent position. He advises an ounce of castor oil two hours later, to expel the worm speedily and entire. Koussin, an alcoholic extract, is now used by some in ten to twenty-grain doses, instead of the crude drug.

Kamala, the glandular powder and hairs from the capsules of the *rottlera tinctoria*, is an efficient and not unpleasant tenicide. It may be given in doses of from one to two drachms, prepared in a gum-arabic emulsion, and repeated every three hours if necessary. No purgative is required to follow. If two or three doses do not prove effectual, add about one-half drachm of the oil of male fern, and repeat.

Pepo semen, an emulsion of pumpkin-seeds, is ranked in this country as one of the best tenifuges. It possesses the advantage of producing no unpleasant, injurious effects. The emulsion is prepared by rubbing up about two ounces of the fresh seeds in a mortar with a pint of water, and straining through a cloth. To this ten to fifteen minims of sulphuric ether should be added, and the whole quantity taken at one dose, in the morning on an empty stomach. If the first dose is not effectual, it may be repeated each morning for several days.

Turpentine is an efficient tenicide, but its unpleasant taste and the ill effects following its use have prevented its general employment, save in cases which have resisted other methods of treatment. It may be given in one to two drachm-doses every half-hour until an ounce is taken. Bartholow advises uniting with it an equal amount of castor oil. It is probable that any of the medicines before mentioned are equally effectual, and less injurious to the system.

General Therapeutic Indications for Intestinal Worms.—In addition to the methods suggested for the destruction and removal of intestinal worms, our Materia Medica affords a number of remedies which have been proved valuable for the relief of symptoms associated with the presence of these parasites or which remain after their removal.

Cina is our most important remedy. It not only covers the range of symptoms most often found in connection with the presence of round or thread worms, but containing santonine as its active principle, it is practically a vermicide, and frequently the only remedy required for the removal of the parasites and the symptoms they may have produced. Its chief indications are: child irritable and cross; has dark rings around the eyes, and a sickly expression; white and bluish around the mouth; tossing about in sleep, with sudden cries; boring in the nose with the finger; grinding the teeth at night; great hunger, or loathing of food; nausea and vomiting; abdomen hard and

distended; twisting, colicky pains; itching of the anus; turbid urine; dry, hacking cough, which causes gagging; twitching of the muscles, and convulsive motion of the head and limbs; fever, usually intermittent or remittent in its character.

Ignatia.—Especially in mild, nervous children. Itching and crawling at the anus and in rectum, as from thread worms; prolapsus ani; epileptiform convulsions.

Mercurius.—Excessive hunger; salivation; fetid odor from the mouth; abdomen hard, distended and painful; glandular swellings; will sometimes cause discharge of ascarides or of lumbrici without other aid.

Aconite.—Worm fever. Excessive restlessness, face red and pale alternately; loathing of food; intolerable nightly tingling and itching at the anus as from thread worms.

Spigelia.—Nausea every morning, better after eating; squinting; sensation of a worm rising in the throat, better after eating; itching and tingling in anus and rectum.

Sulphur.—Especially after other remedies have failed; excessive, ravenous hunger, though the stomach feels full and distended after eating but little; nausea before meals, and gone, faint feeling about 11 A. M.; abdomen distended; itching and crawling in rectum and anus; turbid urine; emaciation and debility.

Calcarea carbonica.—In leuco-phlegmatic children, especially where there seems to be a hereditary predisposition to worms; abdomen hard and much distended; children of a scrofulous habit.

Consult also *Terebinthina*, *Stannum*, *Cinchona*, *Ferrum*, *Sabadilla*, *Urtica urens*, *Teucrium* (thread worm), *Antimonium crud.*

For the symptomatology, diagnosis and treatment of other forms of intestinal parasites than those here mentioned, including trichina spiralis, the reader is referred to works on general practice.

CHAPTER VII.

INTESTINAL OBSTRUCTION.

INTUSSUSCEPTION—*Definition.*—Intussusception, or invagination of the bowels, occurs when one portion of the bowel passes into another adjoining portion. It is not, properly speaking, a disease, but rather an accident and therefore belongs more to works on surgery than medicine. It is, however, essential that the student of pedology should be familiar with its symptoms and nature, for it is one of the most painful and dangerous maladies, and everything pertaining to its relief depends on its early recognition.

Fortunately, it is of rare occurrence, especially in private practice. Rilliet and Barthez have, however, recorded twenty-five cases as occurring in their experience and Dr. J. Lewis Smith has tabulated the history of fifty-two cases. Nearly one-half of these cases were under six months of age. Leichtenstein, who has compiled statistics of four hundred and seventy-three cases, says: "Half of all invaginations occur during the first ten years. The first year, after the third month, is remarkable for a special frequency—one-fourth of all intussusceptions." No case under three months is recorded by either of these observers.

Some curious facts relating to sex and previous condition of health are brought out by the statistics furnished by these gentlemen. Of the twenty-five cases collated by Rilliet and Barthez all but three were boys, and of thirty-four cases of J. Lewis Smith's fifty-two, twenty-three, or two-thirds, were boys. Among the latter collection one-half of the number had been in previous good health when the accident occurred, while the other half had been more or less ailing. Most of the latter had been suffering from diarrhea, dysentery or constipation, or diarrhea alternating with constipation.

Dr. Smith therefore concludes that the two opposite conditions, namely, constipation and the diarrheal maladies, so often precede the displacement that they must be regarded as common causes. He further says: "The great liability to intussusception in infancy is due partly to the anatomical character of the intestine in this period of life, and partly, doubtless, to the fact, that there are more frequent irregularities in the

intestinal movements than in older children. In the infant the walls of the intestines are thin, the mucous and muscular coats and the connective tissue being much less developed than in those that are older. The mesentery and meso-colon have also greater depth as compared with the same in other periods of life, except the meso-colon at the points where it passes over the kidneys, in which places it is very short or even in some cases nearly absent. Moreover, the space occupied by the large intestine, in which part of the digestive tube intussusception commonly occurs, is much shorter relatively to the length of the intestine, than in those that are older. In about thirty measurements which I have made of the length of the large intestine and the space occupied by it, the latter was found on the average about one-third that of the former, which of course, necessitates doubling of the intestine on itself. These peculiarities of structure in the infant obviously favor the occurrence of intussusception."

The direction of an invagination is always downward in the direction of the normal peristalsis; that is, that portion of the intestine which receives the other is always on the lower or anal side.

In the majority of cases of intussusception occurring in infancy and childhood, the seat of trouble is near the ileo-cecal valve. Either the ileum is invaginated in the colon or the first part of the colon is invaginated in the part succeeding it. In rare instances the intussusception takes place in the small intestine. Sometimes there is so little constriction of the incarcerated portion of the bowel that it remains pervious. In these cases life may be maintained for weeks or months without any material change in the displacement, but death ultimately takes place from exhaustion.

Symptoms.—The symptoms of intussusception are very similar to those of strangulated hernia. Instead of the obstinate constipation, however, which marks the latter malady, we have in acute cases, great tenesmus with blood and bloody mucus, extruded from the anus.

In some part of the abdomen, corresponding to the seat of the invagination, we have an elongated, doughy tumor. Very soon after this tumor is found we have vomiting, first of food, if any has been recently taken, and after that mucus and blood. Stercoraceous vomiting occurs in only one-fourth of the cases.

The pain is very great and is accompanied with constant tenesmus. There is a sudden supervention of the symptoms of collapse, such as pallor, sunken eyes and rapid pulse. In chronic cases all of these symptoms may be absent. Goodhart tells of a case that occurred in his practice, in which there was

an utter absence of all signs of intussusception before death, and the invagination of the bowel was only discovered *post mortem*. Usually, however, the symptoms are well marked. At least, there is no mistaking the fact that the child is desperately ill. The onset of the acute symptoms is sudden. Thirst is nearly always present and tenesmus is rarely absent. The temperature is at first normal, but very soon becomes sub-normal.

In a large proportion of cases, a careful palpation of the abdomen reveals a sausage-shaped, soft, elastic, and doughy tumor, which at first is not painful to the touch, but soon becomes so. It varies in size from an egg upward, but is rarely more than a few inches long. Sometimes the tumor is so low down in the colon that it can be felt by the finger inserted in the rectum. In acute cases the diagnosis is easy, but in chronic cases it may be attended with extreme difficulty. When the diagnosis is once made there is nothing to be gained, but much to lose, by procrastination. The most energetic measures should be instituted at once.

Prognosis.—In acute cases, where the onset of symptoms is sudden and severe, the treatment is usually unsuccessful, and in from twenty-four to thirty-six hours, the child dies. But enough cases have terminated favorably under treatment to furnish ground for a certain amount of hope. In chronic cases strangulation, as a rule, does not occur, and the case may go on for weeks or months with only ill-defined symptoms. The pain at first is paroxysmal, and there may be long intervals during which it is entirely absent. Vomiting may be present or not. At any time, however, these chronic cases may take on acute symptoms, or on the other hand, may in time terminate favorably even without treatment.

Dr. Hern calls attention to a valuable diagnostic point in this connection, *viz.:* in chronic invagination the tumor moves its position and gradually advances, while the tumor resulting from fecal impaction remains stationary.

Treatment.—It is only in chronic cases, not attended by urgent symptoms, such as vomiting, acute pain, and threatened collapse, that medicine can be of any service. But in these chronic cases, remedies calculated to control spasms and allay irritability, may prove useful. These remedies are mainly *Belladonna*, *Gelsemium*, *Colocynth*, *Nux vomica*, and *Hyoscyamus*. No medicine having the effect to stimulate peristalsis is permissible under any circumstances.

In acute cases the treatment must be principally mechanical or surgical. Gentle massage of the abdomen may sometimes succeed in disengaging the incarcerated part; but no great amount of time should be spent in the employment of measures

like this, which are so manifestly unreliable. Our main dependence, this side of laparotomy, must be on injections of oil or water, or insufflation of the bowel by means of gas or air. Both of these measures have been used successfully, and both appeal to reason and common sense. There is a difference of opinion as to which is better, and the record of successful cases shows that each has succeeded after the other has failed.

In using water enemata, the child should rest on a pillow, or on the nurse's lap, with the hips elevated at an angle of 45°. The water should be warm, and should be gently poured into the bowel by means of a fountain syringe held above the patient sufficiently high to secure a hydrostatic pressure of five or six pounds to the square inch, *i. e.*, twelve to fifteen feet. Experiments on the cadaver have demonstrated that the normal colon will bear a pressure of eight or nine pounds without rupturing; but it must be borne in mind that in a case of intussusception twenty-four hours, or less, may produce a gangrenous state of the bowel, and its resistance be thereby greatly lessened. The water should be allowed to flow steadily and gently into the gut, and not in a sudden or spasmodic jet.

While the enema is being given, the abdomen should be manipulated by an assistant, so as to urge the stream of water into the constriction. It may be necessary in some cases to resort to anesthesia to secure a thorough trial of this proceeding. In case of failure, the operation should be repeated again after a few hours' rest. In using insufflation of air, a common bellows will answer, using the nozzle of a Richardson syringe and a rubber tube. The nozzle of the syringe will have to be closely packed about the anus, in order to prevent the outward escape of air. There is not so much danger of rupturing the bowel with air or gas as with water, but it may be well to use some caution, lest such an accident might happen. There are various appliances for generating gas for use in such emergencies as this, to be had of the instrument-makers; but a description of them is not deemed necessary.

When these measures have failed to relieve the invagination, there is but one resource left, and that is laparotomy. The published statistics of this operation on children are far from encouraging, for they do not bear well the shock which is unavoidable in opening the abdominal cavity. But cases of recovery after laparotomy has been performed have been recorded, even in children as young as six months; and after other measures have failed, the case is always so desperate that even a forlorn hope is better than no hope at all.

The method to be pursued in the performance of the operation belongs properly to works on surgery.

CHAPTER VIII.

DENTITION.

THE development of the teeth and their eruption through the gums marks one of the epochs or stages in the progress of of the infant toward maturity, and is the only one that is accompanied more often than otherwise, with pain or general constitutional disturbance. It is not to be understood that dentition is in itself a morbid process or that it is always accompanied by pathological symptoms. On the contrary, the process is a purely physiological one, and in exceptional cases proceeds from beginning to end without symptoms of an abnormal character. But these exceptions are rare. As a general thing, for some time before the eruption of the teeth there is more or less restlessness, some slight fever, irritability of the stomach, and diarrhea. It does not always follow that such disturbances as these just mentioned are altogether due to the teeth, for the teething period is one of great general activity, and other portions of the organism are undergoing change and evolution, as well as the gums. Towards the end of the first year of life, the follicular apparatus of the intestines is undergoing increased development, the cerebro-spinal system is passing through a stage of rapid growth and high functional activity, and most of the organs and tissues of the body are in a state of active change. The evolution of the teeth is not, therefore, a solitary instance of developmental progress, but corresponds to a similar activity of growth in other parts. It is not at all strange that a period of such rapid transitions should be also a period of exceptional susceptibility. And thus we find it to be. During this period morbid impressions, which later on would soon be overcome, are now more lasting and serious; and functional disturbances, which ordinarily would soon rectify themselves, easily drift into incurable maladies.

The first dentition—or, to speak more accurately, the first dental epoch—begins at about the middle of the first year and ends towards the beginning of the third year, or when the infant is two years or two-and-a-half years old. The progress of dentition, however, is subject to many deviations. In exceptional cases, the first of the milk teeth appear much earlier than the time above mentioned, and cases are on record of children born

with teeth. In other cases the dental epoch is delayed, and the entire set of milk teeth is not erupted until the child is five or six years old.

Under normal conditions, the first dentition begins at about the fifth or sixth month, and continues with occasional pauses until the full twenty teeth have made their appearance. The teeth are inclined to erupt in pairs, those of the lower jaw preceding those of the upper by a brief interval. Occasionally in precocious children a considerable number of teeth are erupted together, or so closely together as to be a source of danger.

This happens often in children in the best of health, plump, large and rosy, but is not devoid of danger. Their plethora and precocity are a misfortune, for an infant at this early age, no matter how strong and healthy, can bear only a certain amount of nervous strain.

Ordinarily the milk teeth make their appearance in the following order:

Between the fifth and seventh months after birth the two central incisors of the lower jaw erupt, at or about the same time.

Between the seventh and ninth months, the two upper central incisors appear, followed shortly by the two lateral incisors.

Between the ninth and twelfth months, the two inferior lateral incisors, the two upper anterior molars; and in the two succeeding months, the two lower anterior molars appear.

Between the fifteenth and twentieth months, the four canine teeth erupt. Between the the twentieth month and the middle of the second year, the four posterior molars appear.

The eruption of the twenty milk teeth, or as they are sometimes called, the deciduous teeth, is now complete, and no more teeth make their appearance until the fifth or sixth year, when these teeth fall out or are forced out, to make place for the permanent set. The temporary teeth drop out in about the same order as they made their appearance.

While the order above given is that which is usually adhered to, it is not uncommon for this normal sequence to be violated. The upper incisors sometimes erupt first, and when such is the case, their appearance is usually somewhat delayed. In rare instances, the molars or canines precede the incisors, a posterior molar erupts before a canine, or a canine precedes an anterior molar.

With some superstitious but otherwise intelligent people, the eruption of the upper incisors first is considered a bad omen. Among some of the tribes of Central Africa, a child that cuts the upper teeth first is believed to be *maiko* (unlucky), and certain to bring death into the family. Such a child is, therefore, sold to the Arabs.

SYMPTOMS AND DISORDERS OF TEETHING.—Shortly before the teeth begin to make their appearance, there is a noticeable increase of saliva, which dribbles from the mouth and is called *drooling*. At the same time, the infant exhibits an uneasiness of manner, which is referable to the gums, and which is partially relieved by rubbing them. In pursuance of this object, the child "munches" with his jaws, sucks his lips and gives other evidences of uneasiness. His sleep is disturbed and during the day frequent contractions of the brow give indications of pain.

Examination of the mouth reveals the source of discomfort. The gums are found swollen and cushiony, and shortly before the tooth appears are hot and tense. At this time friction, which before was pleasant, becomes very painful. The gum is evidently tender, which tenderness, however, subsides as soon as the tooth is through.

The pyrexia of teething is very irregular, and subject to rapid variations. It is often higher in the morning than at night and fluctuates during the day.

These symptoms do not always accompany immediately the eruption of a tooth, but may precede it by days or even weeks. Nor are the symptoms steady and persistent. They come and go—waxing and waning in severity, and frequently subsiding altogether for a time, so that the child passes through alternate periods of suffering and ease before the tooth finally erupts. The sense of discomfort, of pain and general disturbance which the infants feel, is not usually so great at the time the tooth pierces the gum, as it is when the tooth is forcing its way upward through the dental processes which hold it securely in the jaw.

COMPLICATIONS.—The symptoms just described are to be regarded as the natural accompaniment of dentition, and in themselves do not indicate anything about the process of an abnormal character. But oftentimes these symptoms are but the precursor of others more serious in their nature, and which are to be considered as accidental complications. They arise from ordinary causes of derangement acting upon a body already in a state of irritation and fever, and therefore peculiarly susceptible to their malign influence.

These complications are for the most part stomatitis, repeated vomiting and diarrhea, gastritis, cough from pulmonary catarrh, otitis, various forms of skin disease, and certain disorders of the nervous system, such as squinting, tonic contractions of muscles, convulsions, etc.

Some children at this time are remarkably subject to colds, and pulmonary catarrh is a common complication of teething,

and when present should never be neglected, for the reason that it may easily lead to a severe bronchitis or broncho-pneumonia. If the teeth are cut in rapid succession, a looseness of the bowels is apt to prevail to a greater or less degree during the whole period of dentition. If the looseness remains confined within moderate bounds, it may do no harm; but on the contrary have a salutary effect in relieving the irritation and tension of the nervous system. It should not, however, be allowed to transcend certain bounds, especially in the summer time, for the reason that a simple and innocent diarrhea may be quickly changed into the inflammatory form from some indiscretion in eating or sudden atmospheric changes, and speedily get beyond control.

The ordinary diarrhea of teething consists of green or yellow matter with small lumps of undigested curd. The latter characteristic is obviously due to a fault of digestion, and if attributed solely to the teeth might be allowed to go on without treatment, which would be decidedly improper. Food, such as milk, that may have been perfectly well digested under other circumstances, may be entirely indigestible now, and if so, should be changed to cream or raw-meat juice or to some other bland and unirritating food, and remedies should be administered to relieve the gastric irritability before milk can safely be resumed again.

PREMATURE DECAY OF TEETH.—There is a marked difference in children as regards the tendency to decay in the deciduous teeth. As a rule, more or less of them decay before they fall out, and before the permanent set are ready to replace them. In such cases it is very bad practice to have them extracted, for the reason that the pressure of the tooth in its socket is necessary to preserve the contour of the jaw-bone and prevent the permanent tooth behind it from coming in crooked.

When the milk teeth are extracted prematurely, the permanent set are almost certain to present an irregular and unsightly outline. This can easily be prevented by killing the nerve of the milk tooth with creosote or otherwise, and filling the cavity with cement or some inexpensive material that will stop the tooth from aching and preserve its usefulness, until its fellow of the permanent set is ready to take its place.

As soon as one of these teeth shows signs of decay, the child should be taken to a dental surgeon at once. If delayed, the tooth will soon begin to ache and the child will refuse to use it for purposes of mastication. As a result the food will be "bolted," indigestion will follow, and immense mischief may result.

THE PERMANENT TEETH.—The second or permanent set of teeth numbers thirty-two, and erupt in the following order, those of the lower jaw preceding those of the upper:

Sixth year, first molars.
Seventh year, central incisors.
Eighth year, lateral incisors.
Tenth year, first bicuspids.
Eleventh year, second bicuspids.
Twelfth to thirteenth year, canines.
Thirteenth to fifteenth year, second molars.
Seventeenth to twenty-first year, wisdom teeth.

It will be noticed that the permanent teeth are as many years in erupting as the milk teeth are months, which fact explains in a measure, at least, why the system is so much more liable to be disordered in the latter case than in the former.

TREATMENT OF DENTITION.—In the majority of cases the troubles which are incidental to teething are not attended with danger, but are trifling in their nature and transient in their effects. Some infants, however, suffer torture with every new tooth and require relief quite as much as if the disturbance was more serious. Fortunately for these sufferers, there are many remedies of great value, which, properly given, may not only ameliorate present pain, but obviate serious complications. When simple diarrhea is present, it does not, as already intimated, require treatment so long as it remains simple and not profuse enough to cause exhaustion. Should it pass these bounds, however, such remedies as are mentioned under the head of Diarrhea may be given, the particular remedy being chosen with regard to the special indications of the case. In case the stomach is irritable from reflex sympathy, it may be necessary with bottle-fed infants, to change the food temporarily to one more bland and easily digested. When cow's milk has been used, cream may be advantageously substituted for a few days, or some one of the more easily digested baby foods, although it be less nutritious and tissue-making than that previously given. After a day or two the regular food should be resumed. Barley water or the bread jelly mentioned on page 56 may answer temporarily. When the teeth are slow in making their appearance, or when they decay soon after eruption, calcarea carb. should be given in the third decimal trituration, a one-grain powder three or four times daily. In case the teeth are much delayed and the gums remain a long time swollen, white and painful, calc. phos. is the remedy. It

is all the more indicated if the infant sweats much about the head whenever it falls asleep.

When there is a hacking cough (symptomatic or reflex), nux vomica; this remedy is also indicated in constipation.

With violent thirst, heat, fever and restlessness, aconite.

Belladonna is indicated by starting in sleep, face flushed, jerking or twitching of muscles, as if convulsions were impending.

When there is sleeplessness, much agitation, now crying and then gay, coffea. If convulsions have already developed, gelsemium or cuprum, according to their special indications, should be given. (See passiflora.)

The symptoms calling for ignatia are trembling all over; piercing screams; convulsive jerkings of single parts; stools attended with tenesmus and prolapse of the anus; child cries and sobs, and the latter continues after the crying subsides. Mercurius Sol.—copious salivation, and sometimes little blisters are seen on the tongue, gums and cheeks; quite large ulcers are sometimes seen on the protruding gum; sleeplessness; stools green, slimy and accompanied with tenesmus. Silicia—in scrofulous children who easily take cold, stools difficult, dry and hard; the stool often recedes before its passage is effected; profuse sour-smelling perspiration covering entire body, or affecting the feet more particularly; fever toward evening, and lasting into the night. Hellebens nig.—when brain symptoms predominate, and a hydrocephaloid condition exists or seems impending; child has spells of frenzy, very excitable; complains of falling; sleeps badly; stools white and jelly-like. But the remedy of all remedies, and the one most often called for during the teething period, is chamomilla. This remedy is to infants and children what pulsatilla is to women; a veritable *vade mecum.* Its special indications are great restlessness, starting and jumping in sleep; when awake it wants to be carried all the time; one cheek red, the other pale; great thirst; gums red and tender; dry, hacking cough; very thirsty, likes to hold its mouth a long time in cold water while drinking; stools grass-green, or slimy with mucus. The symptoms are very similar to coffea and belladonna, but it has a different colored stool, and the symptoms are more manifestly of local origin.

At the risk of seeming to be dogmatic, I would say that *aconite*, *belladonna*, *chamomilla* and *gelsemium* form a quartette of remedies that will meet nearly every indication arising in the course of teething, where remedies are called for. There is another remedy with which I have recently become acquainted, and which seems to meet the erethism present in these cases better than any other remedy. It is passiflora, or the passion-

flower. No proving has yet been made of it, that we are aware of, and it is generally used in the form of the tincture or fluid extract. Of the tincture, ten to fifteen drops may be given to a child under six months of age, and to an older child twice this quantity. It is used somewhat empirically by the eclectic school for convulsions, nervousness, wakefulness, and tetanoid conditions. In three cases of eclampsia in which I have used it, it gave prompt relief; diminished the severity and frequency of the spasms, and seemed to act promptly and continuously. In one case where an infant a year old had been having spasms at frequent intervals for twenty-four hours, only one convulsion occurred after this remedy was given. It should be given in a little sweetened water. In all cases where the physician is called to attend a young infant or child, the state of the gums should be ascertained by personal inspection. In many instances the gums will be found swollen, hot and tender, and the promptest relief will be afforded by incising them.

THE GUM LANCET IN DIFFICULT DENTITION.—It seems passing strange that nearly all recent authors on the diseases of children speak slightingly or deprecatingly of the lancing of gums of teething children, while all recent authors on dental surgery are outspokenly in favor of it. Such eminent authorities as Rilliet and Barthez utterly discountenance it, while one of the latest and highest authorities in this country makes the statement that the gum lancet "is used more by the ignorant practitioner who is deficient in the ability to diagnosticate obscure diseases than by an intelligent man who can discover more clearly the true pathological state." Such a statement as this, coming from such high authority, would be paralyzing to the young practitioner were it not a well-known fact that many children die of convulsions, or drift into a hopeless eclampsia, when the most rigid search by the most skillful physician can reveal no pathological state except tender and swollen gums overlying an impacted tooth, that may be released and all pain and reflex phenomena relieved immediately by the use of the gum lancet.

A case recently sent to me for diagnosis and advice by my friend, Dr. J. D. Burns, of Grundy Center, Iowa, will illustrate what has just been said. The child was a girl eighteen months old, well developed and the picture of rosy health. The doctor may tell his own story. I quote from the letter which accompanied the child. "For nearly a year she has been troubled with a nervous affection which does not yield to treatment. The trouble is spasmodic in its nature and epileptiform in type. The peculiarity is that she always cries and holds her

breath at the beginning or onset, the spasm being preceded by more or less jerking of the tendons, when a general spasm ensues, first tonic, then clonic, lasting from a few minutes to a half, and the mother says a whole, hour, which is succeeded by great exhaustion, drowsiness or sleep. The spasms recur at indefinite periods of a day or two or a week. I have used several remedies with no apparent benefit."

I learned from the parents who brought the child and the letter at the same time that the spasms, as they undoubtedly were, dated back some months, at which time the child was eight months old and cutting its first teeth. Up to this time she had been perfectly well, a good feeder, a good sleeper and regular in all her functions. When brought to me she had eight teeth, but all of them had come through the gums with difficulty. Shortly before the successive appearance of each tooth the "spells," as the mother called them, were more frequent. Twice it happened—being recalled to mind during the examination—that they occurred at the dinner table while the child was sucking the handle of a teaspoon or table knife. It was further recalled that any sudden shutting of the jaws together, as in a fall on the floor, was followed by a spasm. An inspection of the mouth showed the gums over the first molars to be hard, tense and swollen. On using the gum lancet an unusual amount of fibrous tissue was encountered, which cut like gristle. A crucial incision was made deep down to the crown of the tooth, but only a drop or two of blood exuded as a result; the child, however, immediately began to cry and went into a spasm which lasted about five minutes.

Both before and after lancing the gums I made a most exhaustive physical examination of the child, to see if I could find any "pathological state," other than teething, to account for the pathological condition, but with negative results. The case was evidently one of eclampsia, with an epileptiform tendency. My prognosis was a guarded one. The eclampsia had been of so long standing—nearly a year—that the convulsive habit had become established. The result will probably be death or a confirmed epilepsy. But if the strictest care be taken to relieve the nervous system from undue irritation by frequent and deep scarifications of the gums, and a proper attention be given to diet while the teething process is going on, possibly better results may be obtained.

Some three months after first seeing this case I received from Dr. Burns the following letter, in answer to my inquiry as to how the case was progressing:

DEAR DOCTOR—Yours of the 20th inst. inquiring about the Wilson child received today. In answer would say, the child is somewhat better; the

spasms are less frequent and less severe, but she still has spasms. I have cut her gums five or six times, every time down to the teeth, but they erupt slowly, and the gums are as tough as cartilage, and grate under the knife; have continued the passiflora in from 5 to 15 drops every two to six hours. I have used other remedies, *viz.*: santonin 3x, nux vom. 3x, ignatia 3x; changed the food, dilated rectum and urethra, used a 4-per-cent. sol. of cocaine on the gums, etc. I am satisfied the great source of irritation is the teeth and digestive system. I have never seen such tough gums, and tender, too. Every time they are freely lanced she is better.

If this were an isolated case, the argument in favor of lancing the gums would have but a flimsy foundation. But such a case as is here described is not isolated. Every physician of extensive practice must have met many similar ones. I recall many cases myself of extreme restlessness, fever, diarrhea, inability to nurse, with jumping and starting in sleep, all of which symptoms were promptly relieved, without medicines, by incising the swollen gums.

The symptoms just referred to may precede the eruption of a tooth by several weeks—when, as old nurses say, the teeth are "breeding" in the gums. It should be understood that the object of cutting the gum is not merely to hasten the cutting of a tooth. There is generally no necessity for haste in this matter, unless there be obvious constitutional disturbance resulting from delay. This disturbance and any reflex phenomena secondary to it do not arise from pressure of the tooth upward against the gum, but downward against the dental nerve at the tooth root. As the tooth progresses forward the root of the tooth progresses downward. When dentition advances normally the alveolar processes of the jaw, which have hitherto confined the tooth closely, are absorbed and cease to hinder its advancement and nothing prevents the rapid and painless eruption of the tooth, but the covering of the gum. When this covering is thick, tense and inflamed, the eruption of the tooth is delayed and an incision of the gum affords immediate relief. When absorption of the alveolar processes does not take place synchronously with the other phases of tooth evolution; when, in other words, the obstruction is in the jaw rather than in its coverings, lancing the gum is obviously of little or no avail. It is during the "breeding" stage, or later on, when the advancement of the tooth is hindered by the undue thickness or undue hardness of the soft covering, that lancing is most beneficial. In these cases we find the gum prominent and in a state of tension over the advancing tooth. Under these conditions the gum should be divided down to the surface of the tooth, not at a point only, but across the whole breadth or length of the crown; in fact, the imprisoned organ should be set free.

The objections urged against lancing the gums are so illogical or so trifling as to be scarcely worthy of serious consideration, and to need only a few words of refutation. The possibility of serious hemorrhage is very remote; so rarely is it encountered that I have never seen it, but even if it were more frequent the same argument would apply to every surgical operation and to all medication. No procedure should be abandoned or forbidden, nor is it contra-indicated, because of an occasional fatality, the result of an idiosyncrasy or of exceptional and unexpected complication. As a rule there is no such danger, and the operation is safe and practically painless. That the operation sometimes demands frequent repetition is no more of an objection than appertains to any medication which fails to afford permanent relief from a single dose. There is positively no danger of injury to the developing tooth or its enamel, except through the grossest ignorance of the anatomy of the mouth or through the most culpable carelessness. Probably the most commonly urged objection is that unless the tooth is erupted before there is time for the wound to heal a cicatricial tissue is formed, which offers increased resistance. This argument is in direct contravention of recognized facts as to the reparative process. Cicatricial tissue is always and everywhere of a lower degree of organization than the original structure, and consequently easier of absorption. The tendency of scar tissue to break down by reason of its lower vitality is a matter of common observation, and, except in the case of gum-lancing, is not disputed by any medical authority. Gum tissue offers no exception to the general rule.

While the operation of lancing the gum is a trifling one, the manner in which it is performed has much to do with its success or failure. As has been already stated, the object is not merely or chiefly to cause a flow of blood, but to remove tension. The cuts should, therefore, be made with special reference to the form of the erupting tooth, and should be sufficiently deep to reach the presenting surface and to extend fully up to and a little beyond its boundaries, so as to insure its entire liberation. It is well to direct the point of the lance toward the lips, instead of toward the lingual or palatal surface of the oral teeth, as there is thus less liability to injure the crypts of the permanent teeth, if from any cause the cuts should be made deeper than intended. Partial eruption of a tooth is generally accepted as a solution of the problem, the slightest presentation being considered as definitely deciding against the necessity of lancing. This is generally true in the case of the incisors—far from true of the cuspids and molars. The cone shape of the cuspids insures a persistence of the trouble, from pressure of the

inclosing ring of gum, until fully erupted. A complete severance of this fibrous ring on the anterior and posterior, as well as lateral, surface is indicated, and is even more necessary than before the partial eruption of the tooth. All the cusps of a molar may have erupted, and yet strong bands of fibrous integument maintain a resistance as decided as before their appearance. In this case either the boundaries of the tooth should be traced with the lancet and all such bands severed around its outlines, or a crucial incision should be made so as to insure perfect release from pressure.

Whenever lancing of the gums is deemed necessary, it should be done in the spirit of the adage, "What is worth doing at all is worth doing well." The modus operandi in carrying out this aphorism is so well described by Dr. James W. White, in the "American System of Dentistry," that I beg leave, for the benefit of young practitioners, to give it in his own words:

"The operator should be seated directly in front of his assistant, the knees of the two parties corresponding in height. Some direct the child to be held cross-wise on the lap of the assistant; others prefer to be behind the head of the child to operate on the left side, and in front to operate on the right side of either jaw. Others take the head on their knees when operating on the upper jaw, and place the head on the knees of the assistant when operating on the lower jaw." (In either position it will be observed that the assistant has complete control of the hands of the child.) "The left hand of the operator should separate the jaws and protect the tongue and lips of the child in such a manner that any unexpected movement may result in injury to his own fingers rather than to the child. In the case of a child disposed to bite, the insertion of a small cork between the jaws will be of service. This should be guarded from falling into the throat by a piece of string or tape, which should be held in the desired position by the assistant." It is rarely necessary to use this expedient, or to use any force after a child has once submitted to the operation, for the pain is so trifling, and the relief from suffering so great and immediate, that it is desired rather than feared.

The instrument employed should always be a gum lancet, used for this purpose and for no other. An ordinary bistoury used for miscellaneous purposes is never permissible.

We have sometimes derived benefit from having the gums rubbed occasionally with a two to four per cent. solution of cocaine; chamomilla and witch hazel are also palliative when rubbed on the gums, and may be used when lancing the gums is contra-indicated or is objected to.

PART IV.

DIATHETIC DISEASES.

CHAPTER I.

GENERAL CONSIDERATIONS.

THE diseases which we are about to consider, are variously designated by authors as the diathetic, cachectic or the constitutional maladies. They are very widely distributed among the human family, but are much more common in civilized countries than in those which are semi-civilized, or barbarous. They are far more common, also, among the poor and squalid, than among the wealthy and well-to-do. With the possible exception of tuberculosis, they are not contagious nor infectious. The question of their hereditary origin is one about which authorities differ, and about which volumes might be written without reaching a definite conclusion. Even if it were otherwise, the question could have no practical bearing, and we therefore leave it to those who have a special taste for polemical discussions. Either of them may be congenital, but more often they do not exhibit their symptoms until some time after birth. They all incline to be chronic rather than acute; and may remain in a latent condition for a lifetime without apparently abbreviating life itself. They are all characterized by such distinct and positive symptoms as not to be easily mistaken one for the other.

One of the peculiarities of this group of diseases is that each and all, either primarily or secondarily, involve the nutritive sphere of activity, and work their principal ravages in the elaborative organs of the body.

In tuberculosis and scrofula, the great lymphatic system is principally involved. The importance of this system has, we think, been underestimated by physiologists and neglected by pathologists. Indeed, the whole glandular apparatus, whose

ramifications are co-extensive with vitality, is but imperfectly understood. The real functions of the liver and spleen are to-day involved in doubt and speculation. This much seems probable, that the lymphatics constitute the great absorbent system, whose office is to take care of waste products, and at the same time furnish, in part, at least, the necessary material for the renewal of life. It is the connecting link between the alimentary canal and the blood current, on the one hand, and an accessory venous system on the other. In early life the lymphatic system is very active, much more so than in maturity, and any derangement along the course of its innumerable channels is sure to be attended by some sort of mischief. The lymphatics may be atrophied congenitally, or by acquisition, and in either case we have as a result, a lack of growth and feeble powers of vitality, from a starved condition of nerve centers. On the other hand, and in contrast with the anemia which attends atrophy, we may have an hypertrophied condition of the lymphatic glands, in which case we have an excess of white corpuscles in the blood, a condition known as leucemia or leucocythemia.

This hypertrophy of lymphatic glands causes the development of small, painless, compressible tumors, which are especially noticeable in the lumbar, mesenteric, epigastric and bronchial structures.

Microscopical examination in hypertrophy of this simple variety, shows only the normal elements of glands, and the total absence of any pathological new formation. In this respect it differs materially from the hypertrophy accompanied by inflammation, which we find in scrofula, and there is no tendency in simple hypertrophy to suppuration. Its prominent symptom is, in addition to the swellings above mentioned, a sickly pallor of countenance, a waxy hue of the skin, and a generally debilitated state of the system. The causes most active in the production of this condition are unsuitable food and bad hygienic surroundings—conditions which medicines are powerless to overcome.

CHAPTER II.

RACHITIS (RICKETS).

Definition; Course.—Rachitis is essentially a disease of the bones or of the bone-producing tissues, and is a common result of faulty diet and of anti-hygienic conditions. It is preëminently a disease of infancy, having but little in common with that disease of mature life known as *osteo-malacia.*

For purposes of clinical study the disease may be divided into three stages: first, the stage of invasion, which is essentially one of malnutrition; second, a stage of deformity, during which there is more or less distortion of some of the bones of the skeleton—the most noticeable changes being usually in the bones of the head, the ribs and the radial bones; the third stage is one of reconstruction or repair, during which the deformities resulting from the disease are in most cases so nearly overcome that in mature life but little if any trace of them is left except in stunted growth, which neither nature nor art can rectify.

Frequency.—The world over, rickets is known as the English disease; but just why is hard to explain, for statistics do not show any great preponderance of it in the British Isles over other countries where the population is equally compact, and where the communities are similarly domiciled. The fact is, the disease is prevalent in all countries and among all nations, and if the health records were equally well kept, there would probably be found little difference in prevalency in one country over another. But statistics, however reliable they may be in a general way, are utterly valueless in estimating the relative prevalency of rachitis, for the reason that its inception is insidious, and its progress is often arrested before medical treatment is invoked. Many cases of rachitis do not go beyond the incipient stage, when fortuitous circumstances, such as change of diet or air, produce a spontaneous arrest of the disease, and not even the family physician is made aware of the fact that a rachitic condition has been menacing.

Such cases as these never reach the record books of hospital or dispensary. Furthermore, the symptoms of rachitis are

often complicated by those of other disorders, of an acute nature, such as bronchitis and affections of the stomach and bowels, which overshadow and obscure the fundamental trouble and cause it to be overlooked. In a somewhat loose and unscientific, but still in a practical and emphatic way, one can judge something of the prevalence of pronounced cases of the disease by noticing the number of undersized and bow-legged males, and of females with illy-formed shoulders and backs, in any community in which he may happen to be, for the majority of these distorted forms are occasioned by early rickets. It is quite true that other causes besides rickets arrest growth and prevent the bodies of children from reaching an ideal form; but no other disease is so commonly responsible for malformations and a lack of symmetrical development. Jenner says: "Rickets is the most common, the most important, and in its effects the most fatal of diseases which extensively affect children." Hassowitz says that in Vienna the number of cases among all classes, rarely falls below eighty per cent. Dr. Thomas Barlow says, "If the question of craniotabes be left out, and attention be carefully directed to the junction-area of the fifth and sixth ribs, there will be no difficulty in finding at least fifty per cent. of examples of distinctive rickets among children under two years attending the out-patients' departments of London and Manchester." These figures are manifestly merely estimates, but may be taken for what they are worth. They point out the fact very plainly that rachitis is very much more frequently met with than has been generally supposed.

Causes.—There is the greatest diversity of opinion among pathologists as to the real cause of rickets. Vogel, Parrot, and many others believe that constitutional syphilis in the parent may cause rickets in the children. Others of equal eminence deny this *in toto.*

However we may regard the disease from a controversial standpoint; how many soever factors may be considered as entering into the etiology of a given case, all authorities are agreed upon one point, *viz.*, that the one factor that enters prominently into every case is the factor of defective food. It matters not whether the rachitic child has been nursed at the breast or has been bottle-fed, the one indictment that cannot be quashed, the one fact that cannot be denied, is the insufficiency or inefficiency of the food supply. In the beginning of every case of rickets, there is somewhere a fault that amounts to a failure, in the matter of alimentation. The nourishment does not nourish. Some essential element necessary to the economy is either absent or is presented in a form which is

Tropical countries & densely populated
(Malnutrition diseases Rachitis)
Not common in south

ineffective. With a ravenous appetite there is lack of normal growth. With abundance of aliment there is perverted nutrition. Abundance does not satisfy ; there is starvation in the midst of plenty.

When breast-fed children develop the rachitic habit, it is usually not until after they are eight or ten months old, at which time it is well known the milk of nursing women is apt to deteriorate. This fact is a very significant one. All statistics relating to the subject go to show that there is a direct and proportionate relationship between prolonged lactation and rachitis. Women who nurse their children into the second year, either because breast-milk is cheaper than other food, or because of a fancied immunity from pregnancy which nursing is supposed to afford, or for other reasons, should know that their children are very apt to be rachitic. Then again, there are women whose milk is never good, no matter how abundant it is, nor how young and seemingly healthy are the women themselves. A woman who has once nursed a rachitic child should never attempt to nurse another one. But with all nursing women there comes a time when the milk loses its nutritive qualities and becomes as an aliment but little better than water. When such is the case, if nursing is persisted in, the infant is in great danger of developing rickets. I know of no reliable means of ascertaining the time when, in a given case, the milk begins to deteriorate by any chemical, mechanical or microscopical test. The time unquestionably varies with different women, and with the same woman at different times ; but I am satisfied from personal observations, that, with American women, especially with those living in large cities, this time is on the average less than twelve months. Indeed, in some cases it may be as early as the fifth or sixth month. The occurrence of pregnancy or the return of menstruation hastens it. To nurse a child beyond this time, whether it occurs sooner or later, is always perilous. But the nursling is not the one most commonly menaced by rachitis. As we have endeavored to show in the chapter on Foods and Feeding, the bottle-fed infant is the one who is most heavily handicapped in the race of life ; and it is the artificially fed children who most readily fall victims to this disease. But it ought not to be so. The principles of bottle feeding are reasonably clear, and the variety of wholesome foods is ample for ordinary needs, if only intelligently selected. Many children drift into a rachitic state very soon after being weaned, because of a mistaken idea that a healthy infant can go directly from the nurse's breast to the general table and there be fed on whatever its fancy dictates.

Histological.—Malnutrition is the principal characteristic of the initial stage of rickets. Until quite recently it was held that certain deleterious elements, admitted into the system with the food, or generated within the system from the food, stood in their relation to rickets as cause and effect. Experiments made on the lower animals, especially on dogs and rabbits, show that rickets can be produced in them at pleasure, by giving them lactic acid in small but frequently repeated doses while they are yet young. It was thought, therefore, that the generation of lactic acid within the system from the use of starchy foods was the prime factor in the causation of rickets. This acid, it is well known, is commonly produced in large quantities in young children as a result of improper feeding, and thus a satisfactory solution of this vexed question seemed easily reached. But the clinical fact has been elicited that children develop a rachitic condition, in whose blood there is certainly no excess of lactic acid. On this point, Dr. J. Lewis Smith says: "Rachitis sometimes occurs in infants who present no history of indigestion or of intestinal catarrh, and in whom there is no ground for the belief that lactic acid, or any other acid, is produced in undue or injurious quantity. In a considerable proportion of such cases, inquiry elicits the fact of anti-hygienic conditions, but there is no evidence of imperfect digestion or of gastro-intestinal catarrh, such as produces lactic acid. In the cases occurring in the New York Infant Asylum, alluded to above, some of the children had manifest gastro-intestinal derangement, but others, who were wet-nursed, gave no evidence of faulty digestion, though the nutriment which they received, was probably insufficient; for, as already stated, by providing a more liberal diet, by allowing, among other articles, the juice of meat, rachitis became much less frequent and is seldom observed at present among the infants of that institution, unless in a very mild form."

The experiments of Heitzmann, Virchow and others show that one of the factors in the production of rachitis, is a deficiency of calcareous salts in the food supply; but it is doubtful whether an excess of lactic acid or the deficiency of earthy salts is sufficient alone to produce the disease, or whether both conditions combined are present in all cases.

On the contrary, there is good reason to believe that the causes are not uniform in all cases, but that varying conditions operate in different patients to produce the same pathological result.

This pathological result is a disproportion between the organic matter and the earthy salts in the various bones which make up the framework of the organism. In healthy bones the inor-

ganic elements predominate over the organic in the proportion of two to one; but in rickets the proportion is reversed, the organic matter being greatly in excess. There is a great diversity of opinion as to just how the disproportion of elements originates. Some maintain that the earthy salts are not elaborated into bone, the process of ossification being arrested in its course; while others claim that, by reason of the excess of lactic acid present, the bony matter is absorbed or dissolved after being wholly or partially elaborated, leaving the organic matter but little altered.

If a long bone be macerated in acid for a time sufficiently long to dissolve out the inorganic matter, it becomes possible to bend and twist it at pleasure. Such a bone is typical of one affected by the rachitic disease. About the ends of the long bones we find a proliferation of the cartilage cells, and in consequence a growth of bone which is larger and coarser than the same in health. A rachitic bone when dried is so openly porous that one can readily breathe through it as through a sponge. In a rachitic bone the ends of the shafts are ossified by cells not only larger, but more fragile than normal, while along the center of these long bones ossification is so slow and imperfect that it readily bends when subjected to any weight or pressure. In mild cases of rickets only a few bones may be affected; but in severe cases every bone in the skeleton may be more or less altered in its histological elements. The tendency of the disease is always to shorten the long bones, such as those of the limbs, and to soften the flat bones, such as those of the skull. This accounts for the square box shape of the head, and the stunting of the figure of a rachitic child. The retarded ossification of the bones in rachitis is more marked in some bones than in others. It is especially noticeable in those of the skull. The sutures remain open for a long time and the fontanels do not close until long after they should. In a healthy infant the anterior fontanel should be closed between the fifteenth and twentieth months, but in the rachitic it may remain open for two or three years.

In should be borne in mind that in the normal state of affairs the brain increases in size during the first six or seven months, more rapidly than does the development of bone, so that up to this age the anterior fontanel is larger than at birth; but after the ninth month it becomes progressively smaller, until it is finally closed at the age above mentioned.

The other bones which exhibit most strikingly the rachitic change, are the ribs and the radius—the sternal end of the ribs and the lower end of the radius.

It is seldom that these bones do not give evidence of the

disease, if it be present, and in greater degree than other bones. They are the first to be affected to an extent that is appreciable to the observer.

Craniotabes, first described by Elsässer in 1843, has till lately always been held to be a sign of rickets. M. Parrot and others have called this doctrine in question, and consider the complaint a sign, not of rickets, but of congenital syphilis. Craniotabes, or wasting of the skull, is a condition of softening of the bones, particularly of the postero-parietal region, by which, under moderate pressure from the finger, the bone caves inward with a crackle like that of stiff parchment. It is of two kinds: in very young infants the bones of the skull will yield under pressure, and sometimes crackle, but this is not a diseased condition. The true disease generally exists in localized patches. It is said to occur in thirty to forty per cent. of all cases of rickets, and is found to perfection from six months after birth onwards. It is an open question how far this condition is due to uncomplicated rickets, and how far to syphilis; but it is a remarkable fact that, since the question was mooted, some very weighty evidence has been produced in favor of its association more with syphilis than with rickets. Dr. Thomas Barlow and Dr. Lees collected 100 cases of craniotabes, and have published the results of a most careful inquiry upon its relationship both to syphilis and rickets. From it they conclude that forty-seven per cent. of the total are almost certainly syphilitic; and to this may be added the observation of Dr. Baxter, that of the twenty-three per cent. of craniotabes in rachitic children, seventy-five per cent. were syphilitic.

The skull of a child affected with craniotabes shows shallow depressions at the diseased parts, smoothly bevelled off into the surrounding bone. The depressed areas may be so numerous as to give the inner table a somewhat trabeculated appearance. The thin layer of bone which covers in the depression is that which gives the crackle as it bends inwards on pressure. In some cases the thinning is more general, involving, perhaps, the entire occipital bone; in others, the local thinning is considerable, and may go on to the formation of a number of membranous opercula. In other cases, again—and the real nature of such is still open to question—there is much tendency, not only to thinning and softening, but to the formation of new bone, in most cases leading to the production of a velvet pile-like layer of osteophyte over the surface of the calvaria between the sutures and the centers of ossification. In this way the sutures come to form furrows, and the shape of a hot cross-bun is produced—the *natiform* skull—and sometimes the bone formation may be so active that the skull may reach a thickness of half

an inch or more. The new bone is very soft in all these cases, can be cut with a knife, and is of a peculiar claret color, from the amount of blood it contains. Many consider this condition of the skull to be a sign of congenital syphilis. It is certainly frequently found in syphilitic infants—in infants in whom other evidences of rickets, though not absent, are yet of the slightest. Nevertheless, I do not think that one can altogether exclude rickets from a share in its production.

Other signs of rickets are found in the epiphyseal extremities of the long bones, and in the ribs. In these the ossifying layer of cartilage at the junction of the epiphysis with the shaft, or in the case of the ribs at the junction of the costal cartilage with the bone, becomes swollen—sometimes enormously so—and thus is produced a characteristic swelling of wrists and ankles, and a beading of the ribs. These symptoms, although present in most cases, are by no means remarkable in many. A child may be very rachitic as regards its head and dentition, and perhaps show a distorted thorax, enlargement of the spleen, and even curvature of its bones, while yet there is but little enlargement either of the ends of the ribs or of radius or tibia.

The bones are soft in rickets, and thus come sundry characteristic distortions of spine, thorax, pelvis, and long bones. In the thorax a double curve is assumed, the ribs fall in at their junction with the costal cartilages, and a vertical depression of considerable extent is produced in such parts of the thorax as are not supported by the solid viscera. The abdominal viscera prevent the falling in of the lower part of the chest; the lateral parts of the upper segment fall in considerably; whilst the sternum becomes rounded and prominent, and the antero-posterior diameter of the chest becomes the dominant one. Some have distinguished between this, the chest of the rickety child, and the distortion due to other causes, such as atelectasis, or non-expansion of the lung. In the latter the ribs yield generally from their angles forwards, and the transverse section of the chest becomes of a peg-top or angular shape, from the sternum becoming carinated. On *à priori* grounds it may be argued that the softened bone curves, not only at the epiphyses, but also generally in its length; there is ample evidence that it actually does so; and there seems little reason why the ribs should not thus yield. The worse the rachitic condition, so much the more yielding will there be, and the lateral grooves will then be pronounced. In the less severe cases the recession of the chest-wall will be less, and the chest will approach the angular type. Moreover, by no means is it certain that this shape does not represent a partial obliteration of the more marked distortions. It is much more common in children of

six, eight, or ten years. The grooved chest is the common type of infancy. It is certain that, as the child grows and the bones harden, the deeper dip of the ribs at the costo-chondral articulations gradually expands again; while the antero-posterior expansion of the lung has become in a measure permanent, and tends to perpetuate the prominence of the sternum. In the same manner occur those distortions of the pelvis, which are so commonly noticed in the victims of rickets.

That of mollities ossium is beaked, or Y-shaped; of rickets, contracted in its antero-posterior capacity by the sacral promontory being unduly prominent. But in extreme cases of rickets, when the body weight has been unduly thrown upon the pelvis, the acetabula may be forced backwards into the pelvis, and a beak be produced by the symphysis and pubic bones. The fibula and tibia bow outwards and forwards; the radius and ulna curve outwards; and in extreme cases the natural curves of the clavicles become much exaggerated. These conditions go with (sometimes they may be replaced by) an unnatural relaxation of the ligaments, particularly at the knees, and thus cause the knock-knees and bandy-legs that are so often seen in late cases of rickets.

A good deal of discussion has been carried on as regards the cause of all these deformities. Some have contended for muscular force acting on soft bones; others for simple weight—the bones, not being strong enough, yielding under the weight they are called to support. Both these forces are probably entitled to some consideration; but the theory which attributes the curvatures to undue weight is no doubt the more important, and most of them may be understood and explained by a consideration of the direction in which the force has acted. In one case it may be the weight of the body in walking; in another, that of one part of the limb upon the remainder, in certain recumbent postures. In the arms it is due to those parts being used as a help to progression, the child moving on all-fours. In the thorax some have attributed the distortion to a combination of softening of the bones with collapse of the lungs, which is a frequent associate and consequence of rickets; others to softening of the bone, and a yielding under the inspiratory pull of the muscles. Of this, however, there can be no doubt, that the disease in the thorax is almost constantly associated with bronchitis and atelectasis, and that in the bones of the spine and extremities curvatures never reach any extreme form in such as have not been allowed to walk or sit up unduly.

Another important point as regards the rachitic skeleton is that the bones are stunted in their growth, and in extreme cases the child may be severely dwarfed by this means.

Symptoms.—Rachitis is a non-febrile disease. The inflammation which some pathologists maintain must accompany the bone changes which occur as a part of the malady is sub-acute, and does not become general enough to raise the body temperature except in rare and exceptional cases. Ordinarily the disease is insidious and slow in its development, occupying months in its gradual and progressive course, before even those changes occur in the skeleton which are so characteristic.

The essential symptoms of the initial stage of rachitis are those of indigestion and intestinal catarrh, such as flatulence, unhealthy stools, poor and capricious appetite and all the accompaniments of malnutrition.

The evidences of indigestion and malassimilation are accompanied by marked mental characteristics. The child is cross, peevish and irritable. Its sleep is easily disturbed and it awakens often. Its appetite may be unimpaired or capricious, sometimes it is ravenous. But it does not grow. It does not care to play like a healthy child. On the contrary, it repels all attempts to amuse it as if annoyed by them. It resents being handled or fondled and cries when approached, as if it feared to be touched. It prefers to be let alone and will lie for hours in a state of listless melancholy, rather than suffer the pain which comes from being disturbed. This soreness is partly muscular and partly due to the changes which are going on in the periosteum of the bones.

Another and noticeable symptom of incipient rickets, and frequently the first one to attract attention, is sweating about the head. It perspires freely, both about the head and neck, especially about the former.

This may occur when the child is awake and is independent of the temperature of the room or the abundance of clothing. It is, however, most marked when the child is asleep. Its pillow is wet with perspiration and drops of sweat may be seen on the forehead and face. Cranial perspiration occurring habitually whenever the child sleeps is a very significant sign. It may not always point to rickets, but is always a dyscrasia.

The abdomen early becomes distended by gases, and this, with enlargement of liver and spleen, produces the "frog belly" so frequently seen when the disease is well marked. The veins of the temple and forehead are unduly prominent and sometimes those also of the neck and thorax. The child is prone to kick off the bed-clothes at night as if the weight of the clothes was intolerable.

But the most significant and certain of the early signs of impending rickets is found in the delayed evolution of the teeth. I do not refer altogether to the eruption of the teeth

through the gums, although this has its significance, but to the whole phenomenon of teething. A perfectly healthy child should show some of the usual signs which accompany this process by the fifth or sixth month. If this age be reached and there be no increase of the salivary secretion; no tumefaction of the gums; no irritation of the nervous system accompanied with suggestive actions pointing to the mouth as its seat; if, in a word, there is no change in the inner contour of the jaw indicative of activity there; and if this condition goes on to the seventh or eighth month, the watchful physician should be on his guard. If, in addition, cranial perspiration is present whenever the child slumbers, and further, if the mental condition—the settled, characteristic melancholy—is apparent, we need not wait for further development to diagnose the disease.

Another symptom connected with teething is often present in children in whom the disease has started after one or more teeth have erupted. It is the prolonged interval that elapses between the cutting of single teeth or pairs of them. These intervals are reasonably regular, as a rule, in healthy children, and any unusual delay in the continuance of the process of tooth evolution, after it has once begun, should not be allowed to pass unnoticed.

These symptoms belong to the first stage and precede that of noticeable deformity. When this latter stage is reached, the most evident signs are to be observed in the head, ribs and radius. The head loses its vaulted form and becomes box-like. It is flattened both on top and sides. Its antero-posterior diameter is elongated. Its width is also increased. The size of the cranium is therefore large, but not usually so large as in hydrocephalus or hypertrophy of the brain. The sutures remain open, so that, between the illy-developed cranium and the equally ill-nourished brain, there is often fluid, simply filling up the space, and not the result of any inflammatory effusion. This condition is termed "*spurious hydrocephalus.*" It frequently happens in rachitis that the cranium is unsymmetrical.

I have noticed this particularly in the case of a child whose mother had the use of but one breast. This compelled the child to always lie on the same side while nursing and the pressure of the head against the breast had markedly flattened that side of it.

But the most pathognomonic symptoms of rickets is caused by the enlargement of the epiphyseal ends of the ribs where they join the costal cartilage. This is, in most cases, very noticeable, and constitutes what is variously called the "row of beads," the "rachitic rosary," or the "rachitic garland." The

wrists also enlarge, owing to the effect of the disease on the epiphysis of the radius.

Complications.—The rickety condition is always associated with general debility, and is often complicated with bronchitis, pneumonia, whooping cough, the eruptive fevers, tubercular disease of the thorax or abdomen, laryngismus and hydrocephalus. Any of these disorders have an unfavorable effect on the progress of the malady, for whatever reduces the general strength and weakens the constitution, is certain to retard recovery when it has once commenced. The changes which take place in the thoracic walls have an injurious effect on both the heart and the lungs. The heart is pressed upon, and after a time more or less hypertrophy is the result. In a case which the author has had under observation for some two years past, in a child now nearly three years old, there is considerable bulging in the precordial region ; and the pulsations of the heart have never been below sixty since he was first seen, which was when he was about ten months of age. His respirations now average twenty. This child has passed through two serious attacks of bronchitis, during which his respirations were as high as eighty for several days, but he ultimately made a good recovery. The case is interesting as illustrating several points in the foregoing pages relative to the course and causation of this disease. The father and mother of the child are exceptionally robust and healthy. The father is over six feet tall, while the mother is but four inches shorter. Both are young, and this was their first child. A few weeks after he was born the mother was taken ill, and unable to continue nursing him. He was placed on the bottle and various baby foods given, but none of them satisfied his needs. He stopped growing, became fretful and peevish, cried whenever anyone looked at him, sweat a great deal about the head, and when I was first called to see him, he was, as stated above, ten months of age and weighed thirteen pounds. It was three months after the writer took charge of him before he gained a pound in weight. It seemed impossible to move him away from this fatal number. After a time, however, he slowly began to gain, until now at the age of four and one-half years he weighs twenty-eight pounds.

A year ago, I delivered this mother of another son, and fortunately she was able to nurse it. This second child of these parents has never seen a sick day since birth, and is larger than his brother, who is older by something over two years.

It would be unfair to conclude that, because one of these children was raised on the bottle and the other at the breast, that the bottle feeding was the sole cause of the rickets. I am not aware what food was first used in the case nor what

judgment was exercised in its preparation, but in my opinion it was the food in the bottle and not the bottle itself that was to blame.

The lungs are apt to suffer more than the heart in cases of rachitis in which the chest is distorted. Semi-collapse of certain lobules is apt to occur, and even complete collapse of the thin edges of the lung is not uncommon. In such cases bronchitis and pneumonia are very apt to prove fatal.

Laryngismus stridulus is another very common and serious complication in rickets. Laryngismus is sometimes called "child crowing," from the peculiar noise which is made at each inspiration. The affection consists in a spasmodic closure or narrowing of the glottis, which greatly impedes respiration and while it lasts it seriously threatens life. As a rule, however, the attack lasts but a few seconds and is harmless. When the attack is severe and prolonged, there is a fixation of the diaphragm, and of the respiratory muscles, and the thumbs and fingers become tightly flexed on the palms. A slight degree of cyanosis may occur and general convulsions may supervene.

Prognosis.—So far as the disease itself is concerned, the prognosis in rachitis is good. Death rarely results from its direct effects. Owing to the depressed and narrowed condition of the thorax, the action of the heart and lungs is embarrassed, and any disease of the respiratory functions is consequently more serious in a child affected with rickets. Under these circumstances, bronchitis and pneumonia are attended by increased dangers. Whooping cough also is much more serious when it complicates rachitis. If the cough be severe while the ribs are soft and yielding, and there be lateral depression of the thorax, the spasmodic cough produces great suffering and involves danger. Measles, when attended by considerable bronchitis or broncho-pneumonia, is another of the dangerous inter-current diseases. Among the remote results of rachitis, which complicate the prognosis, and render it somewhat doubtful so far as longevity is concerned, is the danger to married females, from the deformity and stunted growth of the pelvic bones, should they become pregnant. Labor is often seriously complicated by distortion of the pelvis in women, who have been rachitic in infancy. The older the child is when rachitis begins, the milder is its ordinary course, and the less is the resultant deformity.

Treatment.—That rachitis should be as prevalent among all classes of society, as is indicated, in the early part of the chapter, is an *opprobrium medicorum*, for if any disease is preventable it is this one. No well-fed child has rickets. It cannot be too emphatically impressed upon the medical student that whenever a child shows signs of rickets, an avoidable error in

its diet has been made; and the first step in the way of treatment is to correct this error. It is neither an act of prudence or wisdom to delay a radical change in food. If the child has been nursed at the breast and under five or six months of age, the nurse should be changed; but if older than this, it should be placed on artificial food and part of its diet, no matter what particular cereal is used, should be of an animal nature. If cow's milk is tolerated, well and good; but if not, the juice of raw meat should be given—the meat juice being prepared as directed on page 61.

When the child gives evidence that it is not thriving on the particular food which has been selected for it, another must be chosen, regardless of preconceived opinions or notions.

We have had the best success in rachitis with the Liebig food, in which the starch it contains has been converted into glucose. It so happens that we have always used the preparation of malted food known as Mellin's, and after twenty years' experience with it we can say that we have never known an infant to become rachitic under its use, while we have known many to recover who had become rachitic under other foods.

Cow's milk as an exclusive diet is in these cases inadmissible. Its tendency to form lactic acid simply feeds the morbid process. All foods requiring the addition of cane sugar, to make them palatable, are injurious for the same reason. If an atom of cane sugar be split in two, the result is an atom of lactic acid and an atom of alcohol.

But lactic acid is already in excess in the blood, as we have seen, and is busy creating mischief in all the tissues. To add more is to add fuel to the flame. All forms of starchy foods and those requiring artificial sweetening are pernicious, and this is why the great majority of the so-called "baby foods" fail to meet the requirements of these cases.

This subject is treated of so fully, however, in a preceding chapter that nothing further need be said here. Fresh air and sunshine are very necessary to the subjects of rachitis. Indeed, every hygienic measure available should be utilized, for there is really more practical value to be derived from them than from drugs. The latter are valueless without the former. While the bones are soft and yielding, great care should be exercised to prevent deformities. The patient should not be encouraged to use the limbs or bear weight upon them until they have become firmer. He should lie on an even and soft mattress, but one that is not heating to the body like feathers. Bathing the body occasionally with dilute hamamelis or alcohol is helpful.

Inunctions of olive oil following the bath, are of service also.

In craniotabes, the pillow should be of hair—soft and yet cool, and care must be taken that the yielding parts of the cranium are not unduly pressed upon. When curvatures are unavoidable, orthopedic treatment will be necessary, but should not be resorted to until nature has had an opportunity to act alone, for in many cases, as the muscles strengthen, the bones will be brought into line. Cumbersome apparatuses that are heavy to carry are apt to do more harm than good.

Medical Treatment.—Any one who has read the pathogenesis of phosphorus could scarcely fail to observe the striking similarity between the symptoms of this drug, as observed in cases of phosphorus poisoning, and rachitis. It has produced *osteomalacia* in adults—a disease which in its course and nature is almost identical with the rickets of infancy. It has produced rickets in young dogs and rabbits, when given to them experimentally. It is logical, therefore, to expect that phosphorus would prove curative in this disease, and such is the case as demonstrated by all who have ever employed it. While there are other and valuable remedies to meet the various peculiarities and complications which are liable to arise in the course of the disease, there is no other single remedy that so fully covers the typical case, from its inception to its cure, as this one.

But we do not get its best value when it is given in its simple and direct form. It combines too readily with oxygen to form phosphoric acid, to perform its highest functions. Its stability and effectiveness are greatly increased by adding it to lime, and forming the drug we know as *calcarea phosphorica*, and in this preparation we have a remedy for rachitis which is *par excellence*.

Its sphere of action covers the following symptoms, which are those of a typical case of the disease we are now considering, to wit: Both fontanels open; tardy dentition; sweating about the head; abdomen "pot-bellied;" indisposition to being handled; soft, spongy condition of bone; bones fragile, or easily bent; settled melancholy, and, indeed, the whole catalogue of symptoms which are so characteristic of these typical cases.

Many of these symptoms are also covered by *calcarea carbonica*, but not to the same extent and fullness. The latter is more useful in the incipient stage; the former after the disease has become fully established. Calc. carb. meets more directly the objective symptoms, while calcarea phos. more the subjective ones. The first acts more on the blood and the soft tissues, the other the osseous, and the harder tissues. The one acts superficially, the other more profoundly. Whichever remedy

is used, it must be given systematically and persistently for a long time.

Silicia.—Here, as elsewhere in bone affections, this remedy is of the greatest value; there are few cases of rickets which do not call for silicia at some stage of the treatment. I have observed, however, that when it is given for some time, and this regardless of the potency, there will appear a distressing, gnawing pain in the stomach, which is relieved by eating. I have hitherto failed in relieving this by a simple discontinuance of the remedy. Nux vomica has oftener removed it than any other remedy, but not always. The appearance of this symptom must be the signal to abandon the remedy entirely. Its duration is uncertain, but rarely exceeds a fortnight. The symptoms calling for silicia are similar to those of calcarea carbonica, with the following exceptions: the body is much emaciated, but not soft and flabby; it is "scrawny," skin somewhat indurated, with tendency to boils.—*Gilchrist.*

Other remedies that may be consulted are mercurius sol., colchicum, assafetida, and sulphur.

For the complications which are so common, such as bronchitis, pneumonia, etc., the indicated remedies should be given intercurrently with the constitutional remedy, for the rachitic condition, as indicated above. When laryngismus stridulus supervenes, it requires no different treatment than when the same thing occurs under other circumstances. See chapter on this subject.

CHAPTER III.

ACUTE TUBERCULOSIS.

Definition.—This is a disease which consists of a deposition of gray granular matter, or miliary nodules, into the various organs and tissues scattered throughout the body. It should not be confounded with pulmonary phthisis, for the reason that while this condition may result in ulceration or destruction of the lung, it by no means follows that it always does so. On the contrary, while having many points in common, the two diseases are quite distinct and tuberculosis may invade nearly every other portion of the body, without affecting the lungs at all.

It is a general disease affecting principally infants and children, and in most cases, although not all, is to be attributed to hereditary predisposition.

"Phthisis" is a term used to indicate a tuberculous condition of the pulmonary tissues, those tissues being principally or primarily affected; while tuberculosis is employed to signify a general distribution or dissemination of tuberculous matter throughout the system, but affecting for the most part the lymphatic glands.

The word "tubercle" is a very vague one, and is used so differently by different authors, that it has almost ceased to convey any definite meaning, or indicate with certainty any special pathological process.

The disease here referred to under the title of acute tuberculosis, is one which commonly presents the features of an acute specific fever of indefinite type and without any special signs pointing to local mischief. Yet local mischief is going on apace; histological elements in various tissues are undergoing pathological changes; lymphatic glands are being gorged with "giant cells," and through the medium of the lymph channels the tissues generally are being filled with poorly organized and very vulnerable spherical cells which, on slight provocation, undergo caseous metamorphosis.

The gray granulation is composed of caseous matter, which at first is firm and translucent, but in children it soon loses its translucence and turns yellow.

The nodules of gray or yellow granulations are of various sizes, from a pin's head to a millet seed, and are the result of a specific irritation of the endothelia of the lymphatics. Rindfleisch describes the granule as a product of inflammation, and states that it consists in an increasing accumulation of leucocytes in the connective tissue of the parts irritated. As the lymphatics are everywhere, in all the membranes, blood vessels, nerve tissues and bones, as well as in the glands, so we may have anywhere or everywhere the presence of gray granular matter, ready at any time to cause irritation, inflammation and to finally, circumstances favoring, degenerate into suppuration. The presence of the gray granulation in any tissue is quickly followed by inflammation in the neighborhood of the growths. In the case of a serous membrane, such as the meninges of the brain or the peritoneum, lymph is quickly thrown out, and in time this exudation becomes caseous. When this occurs in the tissue of the lungs, bronchitis or catarrhal pneumonia is set up, and in case of a fatal termination, *post-mortem* examination shows degeneration of the nodules in every stage of progression. Ulceration and the consequent formation of tuberculous cavities in the lungs are not common in early life, although they do occur in exceptional cases.

In the intestines, the gray and yellow granulations occur, especially in the smaller bowel, and involve principally the ileum and the part of the caecum in the neighborhood of the valve. The liver, the spleen and the kidneys are frequently the seat of these tuberculous deposits, the spleen being especially liable to attack.

Causation.—Aside from heredity, it is useless at the present time to discuss the causes which lie at the foundation of acute tuberculosis. The present age will be known to the future historian of medical progress as the age of microbes. Every disease that human flesh is heir to is now popularly supposed to be due to some specific microbe, and in the opinion of the germ theorists acute tuberculosis is peculiarly and especially due to bacilli.

To broach any other theory would be to go counter to this popular opinion, and would lay the author open to the presumption of ignorance or to inexcusable skepticism. Nevertheless, there are those high in authority who have not as yet accepted in full faith the idea that the living body is always, when sick, a prey to inferior and infinitesimal organisms.

There would be an obligation to discuss the germ theory and prove or disprove its tenets, if its advocates based any modification of treatment upon it or helped to answer the question, "Provided it is true, what can we do about it?"

There is, however, no answer to the query, and so we may as well admit that we do not know any more to-day about the actual causes of this disease than did our predecessors of a thousand years ago. Humiliating as it is to make so bold a confession, it is better to realize and face the truth, than to waste valuable time in the futile following of a chimera.

Symptoms.—Children affected with tuberculosis, although often of delicate appearance, are not necessarily thin and feeble looking. In many cases the nutrition is good, and the child is considered in every way a healthy subject, prior to the development of the disease. Sooner or later, however, symptoms are noticeable pointing to disease of special organs. These symptoms may point to the brain or to the lungs, in which case we have such phenomena as is described under the head of tubercular meningitis or pulmonary phthisis. When the disease is general or not specially localized, we have only vague, indefinite and insidious signs to guide us in our diagnosis.

General malaise, pallor, wasting, fatigue, want of appetite, slight fever, etc., etc., may mean much or little, and only close watchfulness and great acumen can construe them properly. Time, often, is the only aid to elucidate the truth. Sometimes a conclusion is scarcely reached before intolerance of light, drowsiness, squint, are noticed; quickly followed by convulsions, coma and death.

Diagnosis.—As already indicated, the diagnosis of acute tuberculosis is sometimes very perplexing. At best the symptoms are vague and indefinite; the fever is rarely high, and in the early stages may be wanting altogether; the gastro-intestinal symptoms are usually well marked, but no more so than when occurring independently from tubercle.

The disease with which it is most liable to be confounded is typhoid fever. This is especially the case when the tubercular affection begins abruptly with high fever, headache and nose-bleed. But typhoid fever has a more regular gradation of temperature, and runs a more even and regular course generally.

Besides this, tuberculosis is prolonged beyond the time when we ordinarily look for a fall in the temperature in typhoid cases. There is a peculiar distress in the face of a tuberculous patient, that is wanting in the other, and the child is dull and spiritless. The history of the case for some time prior to the present attack is somewhat helpful.

In tuberculosis there is usually a history of several attacks of diarrhea, which cannot be accounted for by errors in diet, and a gradual emaciation attended by mild pyrexia. In an infant there is frequently more or less edema of the legs.

If typhoid fever be excluded, and there is a history of gradual wasting, moderate pyrexia and edema of the lower extremities, and more especially if the family history is not above suspicion, the diagnosis of tuberculosis is fairly warranted.

Prognosis.—This is not usually encouraging. If the diagnosis of acute tuberculosis is clearly established, the chances of recovery are desperate. The early symptoms of the disease, as we have seen, are rarely sufficiently plain to indicate the real nature of the trouble, until the general system is filled with granular deposits, and nutrition is irreparably impaired.

Treatment.—When one member of a family has shown evidences of being tuberculous, the other members should be watched with the greatest solicitude, and if possible, placed under better hygienic influences and healthier environments, in the hope of anticipating and preventing the disease in them. The country is preferable to the city; and a dry and warm climate better than a damp and changeable one. As soon as the first symptoms show themselves indicative of indigestion, catarrh or diarrhea, they should receive the appropriate remedies for these complaints. The diet should be made to exclude an excess of sweets and all fermentable matters. In a fully declared case of the disease, our remedies should be given, not alone in the hope of arresting the formation of tubercles, but also to put a stop to enfeebling complications. The remedies which have received most commendation in the treatment of acute tuberculosis are iodium, sulphur, kali iod., baptisia, lycopodium, mercurius and calc. phos.

For further elucidation of this subject, the reader is referred to the chapter on Pulmonary Phthisis.

TABES MESENTERICA.

Definition.—By this term is indicated a tuberculous condition of the mesenteric glands. It is not to be understood that the tubercles in this disease are limited to these glands; for tabes mesenterica is rarely, if ever, a simple affection.

Indeed, when tuberculous nodules are sufficiently large or sufficiently numerous to be recognized in this locality, they are usually scattered, at the same time, generally throughout the system, and a case of acute, general tuberculosis would be phenomenal, which did not, at the same time, involve the mesentery.

It is, however, only in a small proportion of cases of tuberculosis that the mesenteric glands become sufficiently indurated

and swollen to attract attention or complicate the course of the general disease.

Symptoms.—The most prominent features of tabes mesenterica are general emaciation and a tumid abdomen.

The emaciation is sometimes startling. "The sub-cutaneous fat disappears rapidly. The skin is thin, flabby and inelastic; round the limbs, it is loose and hangs like a bag; when taken up between the fingers, it retains the fold raised in the lifting. In the beginning, the muscles can be recognized; afterwards even they emaciate to such an extent that their outlines disappear, and those of the bones are distinctly perceptible. The eyes lie deep in the orbits and have a peculiarly dry and hungry look. The bones of the face, with the thin, flaccid, dry and scaly skin over them, take on a terribly senile expression. The surface is mostly cool, the limbs are cold, the cutaneous veins very distinct and blue, much dilated over the chest and still more so over the abdomen. The voice is thin and tin-like, the cry mostly tearless, the pulse slow (from the heart-muscle), or more frequently rapid, thin and compressible. The lymph bodies of the neck and the inguinal region, sometimes also the axilla, are tumefied." This picture of tabes mesenterica is more or less true to all cases. But the disease is not without variations. In some cases the appetite is wanting and in others it is voracious. Some have diarrhea and others do not. In all cases the stools are fetid. In the majority of cases, there is severe intestinal catarrh, attended with offensive discharges. The peculiar foul odor is largely due to acids formed by the fat, which has not been absorbed, sulphides, and other products of putrefaction. The stools are mostly large and expelled with an instantaneous gush. Fever is not always present, and in some cases the temperature may be subnormal. The tumid abdomen is sometimes sensitive to touch, while in others it is painless. In exceptional cases, the abdominal walls are not particularly distended and they may even be retracted; but in a typical case, the belly is swollen in fearful contrast with the atrophied state of the muscles of the thorax and the limbs. When tubercular peritonitis supervenes, as it sometimes does, the abdominal pain on pressure is exquisite.

When the abdomen is tympanitic, the superficial veins are dilated and prominent. By elevating the legs and relaxing the abdominal walls, tuberculous nodules can be felt, sometimes superficially and again deep down, along the vertebral column. The tumefied glands attain a size varying from that of an almond to a pigeon's egg, or larger, and occasionally from the aggregation of several enlarged glands, a mass is formed double the size of the child's fist. In many cases the glands, however

large, are difficult of detection, for the reason that they are covered and concealed by coils of intestine. When the abdomen is supple and relaxed, however, and the enlarged glands are in the neighborhood of the umbilicus, careful palpation will generally discover them. The variableness of the distinctive symptoms in different cases would render the diagnosis very difficult, if only those of a local character had to be depended upon. The history of the case and the concomitant symptoms must all be given due heed, and even then, there may be trouble in reaching an early conclusion. If the bowels are constipated the intestines are apt to be filled with gas, and this should be remedied before any attempt is made to palpate the abdomen. In advanced cases, the cheesy glands infect the the peritoneum in their neighborhood, and adhesions occur between the intestinal coils, and between them and the abdominal wall. Irregular distension of the abdomen is thereby occasioned and much intestinal gurgling and rumbling. Ulceration of a tuberculous mesenteric gland occasionally occurs, with perforation of the intestine.

Prognosis.—When the tuberculous infiltration is largely or wholly limited to the glands of the mesentery, the prognosis is by no means hopeless, but the more the general system is infected, the more serious and desperate the case becomes. Still no case should be abandoned as hopeless, however discouraging it may appear, for it is never possible to determine except by an autopsy, how much or how little tuberculous infiltration exists, and the severity of the symptoms are not a safe criterion upon which to base a judgment.

Duration.—These cases may be acute or chronic, and on this fact depends the length or brevity of the attack. Acute cases may last for several weeks, or even months, after the symptoms have become sufficiently pronounced to permit of a diagnosis. Chronic cases may last for months or even years.

Treatment.— Infants and children of the strumous habit should receive especial care whenever they show the first symptoms of diarrhea. Any irritation of the intestinal tract is liable to affect the neighboring glands, and cause them to swell. For this reason great care should be taken to exclude everything from the diet that might give rise to irritation of the bowels. They should not be allowed to become constipated, for this, also, is a source of glandular engorgement.

The abdomen should be swathed in flannel, for these emaciated patients are very easily chilled. They should be warmly clothed, and then kept much in the open air. They should be rolled about in an easy carriage, with an avoidance of sudden jars and joltings. If the disease develops in a nursling, the

quality of the nurse's milk should be determined, and changed if necessary. If cow's milk is used it should be peptonized, for the digestive powers of the patient are more or less impaired. The wasting can be combated, to some extent, at least, by inunctions of olive oil or cocoa butter. If the abdomen is tender and painful, poultices of flaxseed meal are to be employed. Bathing with water should be done sparingly, and only as needed for the sake of cleanliness.

Remedies.—The leading remedies for tabes mesenterica are: arsenicum iod.; arsenicum alb.; argentum nitras; calcarea iod.; calc. phos.; mercurius iod. and sulphur. Other remedies than these may be studied, but the foregoing should be printed in full capitals to properly emphasize their worth.

The selection of the particular one for the case in hand will be successful only by a close and careful study of their symptomology, and of the distinctive features of the case itself.

CHAPTER IV.

SCROFULA.

Definition.—The word scrofula is almost obsolete and is so indefinite and meaningless that it cannot long be retained in the nosological list. A much better term is cervical adenitis, or would be if the disease were confined to the glands of the neck. Formerly the word was used synonymously with "struma," and was applied to chronic inflammation of the lymphatic glands, wherever situated, which showed a tendency to spread by local infection and prone to caseous degeneration. A scrofulous individual was one who was liable, from the slightest exciting cause, to have enlargement of the glands, either of the neck or elsewhere, which inclined to suppuration, by reason of defective power of vitality. The term "tubercle" was limited to the gray granulation and caseous nodules affecting the lungs, viscera, and serous membranes. The two diatheses were regarded as closely related, but not identical. Latterly, however, there seems to be a disposition to regard the two affections as different manifestations of one and the same morbid process, and in some recent works the term scrofula is omitted altogether. It is not with any disposition to revive or to countenance a decaying bit of silly nomenclature that it is here retained, but because it has not as yet passed out of use to such an extent but that certain pathological conditions of importance to the student and practitioner might be overlooked or neglected, if discussed under another name. Besides, it scarcely seems appropriate in a work of this practical character to spend either space or type in combatting habits and prejudices that are sanctioned by time and usage, and whose continued employment can result in neither confusion nor harm. For the sake of explicitness, and to indicate the scope of the word scrofula as here used, we cannot do better than to adopt the definition of Meigs and Pepper: "We, ourselves, would be understood to employ it much in the old sense, to indicate a peculiar constitutional condition in which there is a '*vulnerable*' or irritable state of the lymphatics, which renders them liable to become enlarged from trifling causes, and at the same time indisposed to healthy reparative action, and which is also apt to manifest itself by various obstinate chronic inflammations of

the skin, mucous or synovial membranes, or bones." It is universally admitted that scrofula is intimately related to tuberculosis. It often happens that the children of tuberculous parents are scrofulous. And it is an unexplained fact that such children are scrofulous and not tuberculous. That is to say, the "scrofulous" child is very subject to glandular swellings, especially of the neck, and may have suppurative inflammations of the joints, and yet never have any distinctive development of other tuberculous symptoms—such as cough, emaciation or meningeal trouble. This is not always so, for persons who have been scrofulous in early life, frequently become the victims of tuberculosis subsequently. That the two diatheses, although manifestly similar in many respects, are not precisely identical, is shown by many well-recognized facts. We can here only draw attention to a very few of them.

Scrofula is, far more markedly than tuberculosis, a disease of early life. The pathological tendencies of the two diseases are very different. Scrofula affects, more particularly, the superficial glands, the bones, the skin and the adjacent mucous and synovial membranes; while tuberculosis affects, by preference, the serous membranes, the lungs, the solid abdominal organs, and the alimentary and respiratory mucous membranes.

Causes.—What has been said relating to the obscurity that surrounds the etiology of tuberculosis, is equally true of the disease under consideration. All of the theories which have, from time to time, been brought forward to account for its presence, are but idle speculations. We shall probably not reach a perfect explanation of it until we are able to explain and understand *life* itself. What life really *is*, constitutes a question which is no nearer a solution to-day than it was in the very beginning of time; it is only the *manifestations* of life that are observed; its essence would seem, in the very nature of things, to be undiscoverable. Scrofula is one of the many things that disturb and derange the normal condition of life manifestations, and do so in a tolerably regular and uniform manner, so that when we have a certain aggregation of symptoms, we call the disease by this name, and are able to differentiate it from all other diseases. As in the case of other cachexias, the actual disease, while undoubtedly hereditary, is not itself transmitted from parent to child, but merely so strong a tendency to its development that in some cases no care or favorable hygienic influences will overcome it. The causes which tend to thus develop it, act by impairing the nutrition, and include such influences as insufficient and improper food, protracted exposure to damp, cold and especially to vitiated atmospheres, attacks of certain diseases, which, like measles, typhoid fever and

chronic malaria, exercise a remarkably injurious action upon nutrition.

Symptoms.—In the majority of instances, symptoms of scrofulosis appear in infancy, and usually the skin is first affected. There are various eruptions, chiefly on the head and about the nates and genitals, which some observers have thought, but erroneously, to be pathognomonic of the disease. As a matter of fact, it would seem there is little, if anything, in the eruption itself to distinguish it from a similar one in a non-strumous subject. Of all forms of skin eruptions, eczema is probably the most common. The eruption is tardy in development, runs a slow chronic course, is very intractable, and is prone to cause troublesome ulcerations of the skin. It is especially apt to occur about the nose and lips, ears and scalp. The secretions from the nasal mucous membrane and from the mouth, are apt to excoriate the adjacent skin and form eczematous sores. In the same way a chronic discharge from the ear may give rise to an eczema of the meatus and surrounding parts, in consequence of the irritating nature of the discharge. Scrofulous eczema has frequently a peculiarity that may serve to distinguish it from the non-scrofulous variety, *viz.*, the fluid which oozes out is thick and semi-purulent, instead of being serous, and as it dries it forms yellow crusts. The eczema and impetiginous eruptions, so common about the nose and mouth of weakly children, are fertile sources of glandular enlargement. They are very obstinate and hard to cure, so long as there is any discharge from the nose.

Affections of the eye are very common, very intractable and apt to relapse. They do not, however, as a rule, lead to serious damage.

Catarrhal inflammation of the middle ear is very frequent in strumous children, and is often associated with catarrh of the eustachian tube, and the fauces. More or less deafness may be produced. At a later stage the discharge may become purulent and affect the petrous portion of the temporal bone. The membrana tympani is generally perforated.

Chronic enlargement of the tonsils is very common in these cases, and may occur in infants under a year; but more often decided hypertrophy is not noticed before the child is two or three years old.

A catarrhal state of the mucous membrane lining the vulva, vagina, and more or less the urethra, is by no means uncommon in strumous girls of two to seven years of age. The discharge from these parts which ensues is irritating and exceedingly annoying. If considerable, it may be semi-purulent or bloody. In very young girls the discharge proceeds from the

mucous membrane anterior to the hymen, and is, therefore, quite accessible for local treatment.

Among the most formidable of the affections of these strumous cases, are diseases of the bones and joints. Caries of the vertebræ and of the long bones, such as the phalanges of the fingers, the ribs and the sternum, are common, and of these, caries of the phalanges of the hand, or metacarpal bones, are most so. These bone affections are very rare in persons who are not scrofulous. The synovial membranes, especially those of the knee and hip-joints, are very liable to take on scrofulous inflammation. When the disease attacks the knee, the constant activity of the joint usually precipitates a much earlier and more active form of inflammation than characterizes the affection when fixed glandular structures are alone involved.

The suppurative action causes enormous swelling of the joints; erosion and caries of the osseous articular surfaces supervene, from a consecutive or simultaneous deposit in the articular surfaces, and their investing soft parts. Obstinate hectic fever ensues, and the patient may be considered fortunate in escaping death at the expense of a permanent anchylosis of the joint. When the hip-joint is attacked, the case is still more painful, more serious and disastrous than in case of the knee, and recovery is slow and tedious at best, with generally a shortened limb, and a more or less broken constitution for the balance of life.

But the most common of all the lesions of scrofula, and the one most characteristic, is found in connection with the lymphatic glands. Sometimes a single gland, but more often several of them, become enlarged, and after remaining swollen for a longer or shorter time, suppurate; the skin gradually becomes undermined and breaks; the broken-down glands discharge, and a sinus is formed, which eventually cicatrees, after many months, perhaps years, of chronic suppuration.

The cervical glands are far more frequently affected than the glands in other regions.

The glandular enlargement, in most cases, is very insidious, is quite painless, and is free from any local tenderness. The size and situation of the affected glands necessarily vary; a single gland only may be involved, but more often several glands in close proximity are enlarged.

This enlargement is essentially chronic, and the glandular tumor may remain for months, readily seen and felt, but giving the child no inconvenience, and without the slightest pain or tenderness. The ultimate result of this enlargement is problematical. The gland may remain in a swollen condition for weeks or months, and then gradually the enlargement may

disappear. Midway in the effort at resolution it may take on inflammatory action, and proceed to suppurate. The older the child and the better its general health, the better the prospect that the chronic glandular tumor will eventually disappear. After puberty the tendency to suppuration is much less than in early childhood. The more superficial glands are much more liable to break down and suppurate than are those which are deep seated in the fascia or under it. The bronchial and mesenteric glands appear to suppurate less often than the external glands. The axillary and the inguinal glands frequently enlarge as well as the cervical, but not so often, nor do they show an equal tendency to suppuration.

Among the exciting causes of glandular enlargement vaccination should be mentioned in order to correct a common notion, that when such an accident occurs it is the result of impure virus. There is no good ground for such a belief, for the reason that even in apparently healthy subjects, more or less tumefaction of glands is known to take place when the virus is above suspicion.

In cases of this kind there is a probability of a hitherto unnoticed strumous condition, that only required some irritant to awaken it into life and activity. On the other hand, the subject may be entirely free from any such scrofulous or strumous taint, as explained elsewhere (see Adenitis).

Prognosis.—In most cases of scrofula a guarded prognosis should be given. Individuals, especially children, who are subject to glandular enlargements are always delicate and easily upset by influences, that in healthier organizations would pass unnoticed. Sometimes, indeed often, these strumous cases get along well, if once the critical periods are passed. Dentition, and afterwards puberty, however, are trying ordeals for these cases to pass through, and it must not be forgotten that scrofula is so closely allied to tuberculosis that the one is very apt, on slight provocation, to glide into the other.

Treatment.—The treatment of scrofulosis naturally divides itself into two stages, the stage of *dyscrasia*, or predisposition, and the stage of *development*, or of glandular affection. In both stages the treatment must be both hygienic and medicinal, and in case of suppuration operative measures are to be added.

The principal indication of a hygienic nature is to rid the system and keep it rid of all preventable sources of irritation. Scrofulous children are proverbially cold-blooded, and need to be warmly clad. Flannel should be worn next the skin at all seasons, or if the skin is too sensitive for this, a cotton garment may be worn next the body, and flannel over it. The feet should receive extra care, and precautions taken to avoid

getting them wet and chilled. Scrofulous children do not bear well confinement indoors, and should be kept out in the air and sunshine. Where it is possible, they should be taken to the seashore and be allowed to go into the sea water. The sea air is better than mountain air.

There is nothing new to be said in this connection with reference to diet, except that it should be plentiful, of proper quality, and adapted to the digestive powers of the individual in question, age and development being duly considered. Children who have passed the nursing age, will be benefited by being given a small quantity of cod-liver oil two or three times daily.

It has long been a common domestic practice to give strumous children some sort of fat, such as bacon or cream. They seem to crave it, and ordinarily digest it. There is no form of fat equal to cod-liver oil. It is difficult to say just how it acts, but the consensus of the opinion of the authorities of all countries and of all medical schools speaks in its favor.

The stage of *development* of glandular disease presents definite indications for treatment, and the employment of therapeutic measures. It is only occasionally that cases are brought to us soon enough to prevent glandular enlargement. In the majority of instances we are face to face with glands already tumefied, if not inflamed; and the problem before us is not one of prevention, but relief. The object of treatment is two-fold: first, to prevent, if possible, suppuration or caseation; second, if this is impracticable, to secure a speedy and thorough evacuation of the gland, or what is now an abscess, in order to prevent the tubercular matter being carried to other parts. It is not always an easy matter to determine the question whether suppuration or caseation has not already commenced, and proceeded so far as to be incapable of arrest. Dr. Gilchrist says: "The presence of pus may be suspected, when there has been a more or less active inflammation which apparently subsides without a reduction of the glandular swelling; in superficial glands, fluctuation can usually be detected; in deep structures the fact is to be determined in accordance with the principles of surgical diagnosis.

"Suppuration, therefore, is usually readily determined. It is quite otherwise, very often, in the case of caseation. I believe that in the majority of instances, suppuration antedated caseation. When, therefore, there is a history of long duration of a glandular swelling coming on, with inflammation, the gland subsequently having become smaller, yet remaining notably enlarged, the swelling being firm but not painful, and there having been no discharge of pus, it is altogether probable that caseation has

become established. So, also, on the other hand, if we find a case in which there is a history of slow, painless, non-inflammatory glandular swelling, usually multiple, the glands being quite firm, with a tendency to an increase in the number of these enlargements, caseation may be considered as established.

If a case is seen at the beginning of the glandular enlargement, its fate practically depends upon the skill of the physician. If he is a master of his calling, he can generally prevent further development, if he so wishes; if he desires to promote a destruction of the gland, he has means to establish suppuration. Some will prefer the former, esteeming it a rational cure; others prefer the latter method, desiring to eliminate what is held to be a concrete infecting principle, which happy circumstances have localized and placed in their power. If there is the faintest symptom of suppuration, the latter course must be pursued; without indications of suppuration, my opinion inclines to the former method.

To prevent suppuration, reliance must be placed entirely upon remedies, and the first in the list will be *hepar sulphur* and *mercurius vivus*, *calcarea carbon.*, or *baryta carbon.* as secondary resources. If there is a tendency to suppuration, *hepar sulphur* again comes to the front, and the question as to the employment of poultices comes up. Suppuration, if too extensive, may precipitate the very catastrophe which it is desired to avert, *viz.*, the dispersion of the tubercular mass. For this reason, among others, it is not deemed best to use poultices. Sidney Ringer, Hartshorne, Treves, and other writers, have adopted *hepar sulphur* as a remedy of the first importance in promoting suppuration, and the former esteems it of particular value in the early stages for its efficiency in suppressing the tendency to it.

Fluctuation having occurred, and the evidences of the presence of pus being conclusive, the tumor must be evacuated. To allow the abscess to discharge spontaneously is to insure a large, ill-looking scar, a very unnecessary loss of tissue, and to expose the patient to the danger of dispersion of the tubercular matter. The only question is whether to open the gland by a free incision or by aspiration. The more acute the abscess, the stronger are the indications for free incision. In chronic cases, as psoas abscess (*g. v.*), aspiration had better be employed, or some other method which equally prevents the admission of air. Under either circumstance, however, incision or aspiration, owing to the intolerance of the strumous individual there must be no rough handling or squeezing.

In cases of caseation, *hepar* may be given to promote sup-

puration, or a fine seton may be passed through the gland. When the glands are superficial, freely movable, with no attachments to the skin or deep parts, enucleation has been practiced occasionally with very good results. The skin is incised and the gland peeled out; if found attached, as often occurs, even though palpation failed to show such attachment, the attempt must not be made. The operation is a slight one, when the indications exist, but it may be quite formidable in its results, at least if violence is used."

Therapeutics.—The remedies most serviceable in scrofula are given in their alphabetical order, although not in the order of their relative therapeutic value. The list is incomplete, for there is scarcely another malady in which so large a number of remedies may be needed in the course of its progress. A thoroughly complete list would very nearly exhaust the resources of the *materia medica.*

Arsenicum.—Some authorities regard this remedy as of the highest value. Goullon says: "Arsenicum does not act directly or specifically upon the morbid product, but upon the healthy tissue, the vital energy of which it increases and which it enables to resist the pathological element. Restoring general health, it becomes one of our surest remedies to counteract the development of neoplasmata." The waxy complexion, bodily restlessness, weakness, tendency to exhausting diarrheas and general aggravation from cold, are the more prominent indications.

Baryta.—The symptomatology for clinical purposes of the carbonates and muriate of baryta is quite similar, so that the drug is often given in one form or the other indiscriminately; the muriate, I think, is generally preferred, and is credited with a prompter action, and one of longer duration. There is physical and mental debility, with atrophy, and bloated abdomen. The glands are swollen, hard, indolent, and have a tendency to caseation or cretaceous degeneration, rather than suppuration. It seems to be for those of adult years what calcarea is to children. The face is usually disfigured by eruptions of various kinds, but there is little painfulness—at most a soreness or stiffness of the part.

Belladonna.—This remedy is more useful in cases of an acute character, in which the glands become inflamed, rapidly suppurate, and the lymphatics are seen to be inflamed by the red, swollen streaks running to and from the gland. There is much pain and heat in the gland, and some considerable fever; the pus is thick and yellow, and much less in quantity than the degree of swelling and local disturbance would seem to premise.

Calcarea Carb.—Malassimilation ; tardy development of bony tissue ; large head, with open fontanels ; sweating about the head and neck when sleeping ; feet and hands cold and damp ; the perspiration not smelling badly, nor does it make the parts sore ; bloated, protuberant abdomen ; glandular swellings common, suppurating slowly, without pain, and discharging thin, inodorous pus, or yellow, bad-smelling, and excoriating pus. The face is pale and puffy, the bowels easily deranged; takes cold on slight exposure. In fact, the remedy is the typical one for scrofulosis in children, whether the disease be latent or active.

Even without marked symptoms, as above, the flabby skin and the want of firmness in the flesh, so often seen before the active development of scrofulous affections, will call for this remedy above nearly all others. It is also particularly useful when there are indolent glandular swellings, small "kernels," as they are called, with a tendency to caseation.

Calcarea Phosphor.—This remedy resembles the last, but seems more suitable for those who have passed infancy and childhood, and are approaching, or have entered upon puberty. There is emaciation, a dirty-white or brownish complexion, with difficult teething in childhood, and much fetid diarrhea. The deeper glands are oftener affected, with a particular tendency to enlargement of an abscess of the mesenteric glands, and to psoas abscess.

Graphites. — Eczematous eruptions, particularly about the hairy parts, as the head ; red, scurfy eruptions on the eyelids, with loss of the eyelashes ; glandular swellings, indolent, but soft, the suppuration being slowly established, the pus smelling like brine ; the pus is thin, yellow, and excoriating ; the glands discharge through numerous fistulas, and are very slow in healing. The formation of deep, sore fissures or cracks, in the flexures of the joints, particularly the fingers, is quite pathognomonic. I have seen them in the groins of children, extending quite through the skin, with little soreness or inflammation.

Hepar Sulph.—The symptoms of the dyscrasia are very similar to those calling for graphites, the glandular swellings run a more acute course, and suppuration is of a rather better character. The chief indication for this remedy, and one which no other remedy seems to fill as perfectly, is to promote suppuration when once it commences or seems inevitable. In some cases in which I have used it for this purpose, I have been surprised to find that the action was curative, resolution occurring without suppuration ; I am utterly unable to tell under what circumstances this action is secured ; it has always been unexpected. When suppuration threatens in a painfully swollen gland, a few doses of hepar frequently have the effect to

dissipate the pain, and at the same time to wonderfully hasten the pointing of the abscess.

Iodium.—Dark, scrawny habit, extreme emaciation, yet with ravenous appetite; general glandular enlargement, the swellings not being large, but hard and firm. When suppuration occurs, the pus is in large quantities, and quite laudable in appearance. While small lymphatic glands are liable to tumefaction, others, such as the mammæ, are prone to atrophy and disappear.

Mercurius.—Emaciation and dyscrasic appearance, with perspiration on slight exertion; painfulness of the bones and deep parts, particularly at night, after going to bed. Malaise and feeling of illness or prostration, almost indescribable.

Sulphur.—This is one of our most important remedies in the dyscrasia of scrofulosis. It is rarely indicated when the disease becomes active. The face has an old, drawn look; the fingers are disfigured by hangnails; the soles of the feet are so hot that they are kept uncovered at night. There is a tendency to many forms of chronic, painless eruptions; the bowels are always out of order, either constipation or offensive diarrhea existing; nocturnal enuresis is common. The prevailing characteristic is mental and bodily indolence.

CHAPTER V.

INFANTILE SYPHILIS.

WHEN syphilis is acquired in infancy or childhood, its manifestations do not differ materially from those of the same disease occurring in maturity. With the primary lesion or chancre, therefore, the pedologist has nothing to do; nor with the secondary and tertiary symptoms, as they develop themselves subsequently.

It is only with hereditary syphilis, as manifested before, or soon after birth, that we need concern ourselves. As is well known, syphilis is a prolific cause of still-births, premature labors and miscarriages.

Occasionally it happens that the disease shows itself at the time the child is born, but more often an interval of a few weeks, and even several months, may elapse before this occurs. When it does, a rash makes its appearance, and certain symptoms of unmistakable import follow in pretty regular succession.

We do not propose to enter into a discussion of the vexed questions which have given rise to so much controversy, as to modes of communication, order of phenomena, etc., etc. The following facts, briefly stated, are generally accepted by the profession, and are necessary to be understood because of their medico-legal bearing, and for other reasons as well.

The disease may be communicated at the moment of conception by the syphilized condition of either parent.

A syphilized mother is supposed to communicate the disease in a more virulent form than the father, and that blight and a premature birth are more likely to occur where the mother, rather than the father, is at fault. Both parties being diseased at the time of conception, blight and abortion are probable, if not a certainty. Both parents may be free from taint at the time of conception, and yet the child be born syphilitic from the mother's subsequent contamination, provided the contamination occurs prior to the sixth month of pregnancy. After the sixth month the child in utero seems to be in less danger of infection. If the father alone is at fault at the time of conception, he may procreate a tainted offspring, which in turn may contaminate the mother, without any primary experience with the disease on her part.

Parents recently syphilized, though apparently relieved and free from any diseased appearance at the time of conception, may propagate a syphilized offspring.

Physicians are often asked to answer the question as to the precise date, or limit of time beyond which such parents may consider themselves reasonably exempt from risk to any future offspring, but this question it is impossible to answer with certainty. The time varies in different cases. In a general way, it may be stated that parties lately syphilized should not risk procreation under twelve months after the last disappearance of syphilitic symptoms. This is only an approximate rule and cannot be taken as the limit of absolute safety in all cases, for trouble may come after a much longer delay, and in some cases there is no safe period at all. It should be stated in this connection, that the transmission of syphilis to the offspring is not inevitable, when the parents, one or both, have the disease, and that the aptitude to transmit the disease decreases spontaneously, in many cases, with the lapse of time, and this tendency to spontaneous diminution of the activity of the virus is greatly aided by intelligent treatment.

Symptoms.—As a rule the specific symptoms are wanting at birth and do not manifest themselves until from ten to thirty days have elapsed. The infants are, to all appearances, well born and free from any taint whatsoever. Oftentimes, however, the new-born infant shows bad development, with a dirty brown or copper-colored skin, and a scaling cuticle. Such an infant is apt to be atrophied, with a shriveled skin and features pinched and old-looking. In the worst cases, the entire body may be covered with moist and brownish scales or crusts, and here and there blebs containing serum or sero-purulent matter. Such cases as these take food badly and generally die soon from exhaustion. The appearance just described is called syphilitic pemphigus. It presents itself first on the palmar surface of the hands and soles of the feet, and subsequently on other parts of the body. If the eruptive process is delayed to a later period, the appearances will be the peculiar coppery blotches, with or without papular elevations. The mucous outlets, such as the mouth, the nose and the anus, are apt to be fissured and condylomata are common. The fissures or rhagades are very painful and bleed when their edges are put upon the stretch, as in feeding or at stool. An obstinate and distressing coryza is another symptom that is rarely absent. With it there is a nasal discharge, more or less copious, either thin and excoriating or thick and muco-purulent, that poisons the adjacent skin, forming ugly sores, while it blocks up the nares with thick crusts that greatly embarrass the respiratory function. In some

cases a combination of snuffles and condylomata is all there is to designate the affection. The coryzal discharge is not usually attended with ulceration of the mucous membrane, or not to any great extent, and necrosis of the nasal bones and hard palate is rare.

The affection of the nares is prone to extend posteriorly into the faucial and laryngeal regions, producing mucous tubercles and a thickening of the mucous membrane about the epiglottis. Alopecia is usual, embracing not only the scalp, but also the eyebrows and tarsal appendages. The earlier the symptoms are manifested in an infected child, the more severe is the disease. When the symptoms are clearly apparent at birth, the case commonly proves fatal before many days. Among the earliest symptoms of syphilis is obstinate wakefulness at night. The child may be tolerably quiet during the day, but as night approaches it becomes peevish and fretful and cannot be induced to sleep except in fitful naps, from which it wakens with a start or scream. It is supposed that this restlessness is excited by nocturnal pains in the bones, similar to those affecting adults.

Diagnosis.—The diagnosis of hereditary syphilis is not usually attended with much difficulty, although in some cases it may be. The absence of a rash cannot be considered decisive evidence either for or against it. A true syphilitic rash is, at times, so slight in extent and mild in character, as to attract no attention, or it may simulate the rash of one of the eruptive fevers, especially of roseola, so closely as to breed confusion. When the rash appears on the soles and the palms, it has special significance. Chronic snuffling is one of the most reliable signs. If snuffles appear soon after birth, and continue for weeks or months, the fact is highly suspicious. Collapse of the bridge of the nose, when present, is another valuable sign. Enlargement of the spleen, with a tendency to marasmus and without having had previous digestive trouble, is also a strong count in the indictment.

Prognosis.—This is always uncertain if it be not grave, but it becomes less serious the later the appearance of active symptoms. The severity of the nasal symptoms is usually an index of the severity of the disease, and complicates its nature. If they are of such a character as to interfere with respiration and nutrition, they are pretty sure to produce, sooner or later, exhaustion and death. The degree of splenic enlargement has a strong bearing upon the prognosis in syphilis. The majority of cases die, wherein the spleen is greatly enlarged.

When the infant survives, he may apparently throw off all traces of the disease, and grow up a strong and healthy

adult. But when the symptoms have been severe, more or less permanent impression is left upon the constitution and various vicissitudes constantly menace the progress towards maturity.

Treatment.—There is but one remedy for syphilis, whether in child or adult, and when that fails, hope may as well be abandoned.

That remedy is mercurius. The marked analogy between the syphilitic cachexia and the toxic effects of mercury, are so obvious as to render the curative relation of the latter to the former a foregone conclusion to any disciple of our professional dogma, *similia, similibus curantur.* No other drug in the *materia medica* will produce the same train of symptoms from the most trivial and superficial, to those which are lasting and deep-rooted; and no other remedy bears any comparison to it for direct curative power when judiciously administered. The abuse of mercury by the old school should not be allowed to weigh against its use in cases where it is so manifestly applicable, and wherein the universal experience shows that for it, we have no analogue.

As to the particular preparation of mercury, giving the best therapeutic results, there may be a diversity of opinion. The strong tendency to ganglionic involvement, with nutrient failure, in syphilitic infants would seem to point to mercurius biniodide, as the one most applicable, and our own experience is confirmatory of the theory.

It should be given in grain doses of the third decimal trituration every four to six hours, until improvement is noticeable, and then the interval between doses should be extended to ten or twelve hours.

Old-school authorities recommend the introduction of mercury into the system by means of inunction, and as they have many things to learn of us, we need not hesitate to learn from them.

Dr. Alfred Post says: "One of the most satisfactory methods of treatment is inunction by means of mercurial ointment, diluted with an equal quantity of petrolatum. With this ointment, a piece of cloth large enough to cover in great measure the child's abdomen, is thickly spread and placed under the flannel bandage. It is renewed daily, and its position may be shifted from front to back, or side as often as any sign of irritation appears, or regularly so as to forestall any irritation. The movements of the child serve to keep up a slight friction, which is sufficient to introduce the mercurial into the economy. The application of the ointment by actually rubbing the skin with a ball of cotton or a swab covered by the mercurial is sometimes

advised, but is a less satisfactory method than the constant application."

The nutrition of syphilitic infants requires attention. If it is possible, the child should be wet-nursed, but the employment of a healthy wet-nurse for a syphilitic infant, or even for one suspected of being syphilitic, is not justifiable.

In case the mother is apparently healthy, though her child is syphilitic, the child should continue to be suckled by its mother. There is no reason to fear that the child will injure its mother by so doing, in accordance with the facts known as Colles's law.

This law briefly stated is as follows: Women who are not syphilitic themselves, but mothers of syphilitic children, born of syphilitic fathers, possess an immunity as regards liability to contract syphilis from the act of suckling.

This fact, which has been enunciated into a law, was brought into special prominence by Mr. Colles of Dublin, who averred that he had never seen or heard of a single instance in which a syphilitic, breast-fed child, deriving its infection of syphilis from its parents, had caused an ulceration of the mother's breasts, whereas, very few instances have occurred where a syphilitic infant has not infected a strange hired wet-nurse, who had been previously in good health.* In cases where the mother is herself infected as well as the child, especially if her disease was contracted shortly before or soon after conception, she should not attempt to nurse the infant, for the reason that her milk would be almost certain, as a result of the disease, to lack the essential nutritive properties for the needs of the child. It should be placed upon a suitable artificial food, although the chances of its survival are thereby less than they would be if suckled by a healthy wet-nurse.

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* "Practical Observations on the Venereal Diseases," 1837, p. 285.

PART V.

THE ERUPTIVE FEVERS.

CHAPTER I.

GENERAL CONSIDERATIONS.

THE eruptive fevers include measles, scarlet fever, rötheln, roseola and varicella. By some authors variola, or small-pox is included in the list, but we think without reason, and it is here omitted, because it is not in any sense an infantile disease; and when it does occur in early life, it has no features or peculiarities which it does not possess when afflicting adults. These fevers are sometimes called the *exanthemata*, on account of the efflorescence accompanying them; and they are also sometimes called the *zymotic* diseases, or were so called when all eruptive diseases were supposed to be caused by a ferment, "leaven." They are of surpassing interest to the pathologist, as well as to the medical student and practitioner, because of their mysterious origin, their widespread prevalence and their peculiar character. They differ from other forms of acute illnesses, by being always accompanied—when given normal expression—with an extensive and characteristic eruption or rash, which appears at a tolerably regular stage of the disease, remains visible for a certain number of days and disappears, leaving the cutaneous epithelium more or less dead and scaly. They have so many characteristics in common, that they may conveniently be studied as a whole before pointing out their individual peculiarities.

They are all diseases of early life, and when adults are affected by them, as they sometimes are, it is the exception and not the rule.

They are thoroughly democratic in their proclivities, visiting the rich and poor alike, and making no discrimination as to sex or color.

They are universally distributed over the inhabited world, no nation or people, so far as known, being exempt from their ravages. They all incline to appear at times in an epidemic

form, in which case they attack children, who have not been previously affected, over wide areas of country.

They rarely affect individuals more than once, and these individuals thereafter enjoy a complete exemption from further attacks, no matter how much or often they come in contact with them. None of these diseases, however, affords protection from the others. All of them are contagious—some only mildly so—and some of them are both contagious and infectious. All of them are attended by more or less fever, and all of them are accompanied by a rash which is peculiar to itself. All of them have a period of incubation, or a period of latency following exposure, during which there are no symptoms of ill health, and it is not until after this period of incubation, which differs in duration with the different diseases, that the peculiar characteristics of the affection show themselves and render it possible to make a differential diagnosis. Most of them are followed by certain constitutional effects in many cases, which are so constant as to be called *sequelæ*. All of them are varied or modified more or less by the year, the age, constitution, etc., etc.

Formerly all of these eruptive diseases were considered and treated as modifications of one contagion, *viz.*, variola. In certain epidemics of the eruptive fevers, cases occur which partake so much of the characteristics of two diseases, that a diagnosis is very puzzling. This is particularly true of scarlatina and measles.

We have seen cases of measles without prodroma and with a sore throat, and in which the rash was so nearly confluent as to be readily mistaken for scarlatina.

Rötheln and measles are so closely related that a severe case of the one is almost indistinguishable from a mild case of the other.

As a rule, however, each one of these affections has its distinctive features that render it easily recognizable. They are all self-limited in duration.

The etiology of the eruptive fevers is very uncertain. Their contagiousness is everywhere recognized. The contagion of one of them—scarlet fever—has such vitality that it is believed to retain its infectious properties for many years. The contagium of measles is only mildly infectious. Epidemic influence is undoubtedly most largely responsible for the perpetuity of these affections.

In large cities they are endemic. In New York and Chicago there is no month of the year when scarlet fever and measles are not mentioned in the mortality reports. In the transitional periods, spring and fall, they are always more prevalent, doubt-

less for the reason that at such times colds are numerous, and the resistant powers of the system against miasmas is thereby lowered.

The occurrence of isolated cases of these eruptive fevers has always been a puzzling phenomenon.

That apparently sporadic cases do occur, is a matter of frequent observation. The prolonged vitality of the scarlet-fever poison has been frequently demonstrated; and it is believed that the poison is so subtile and transmissible, that it may be conveyed long distances in articles of merchandise, "even in small packages, so that those who chance to open them or come in contact with them, are infected. It is believed that reading-matter, transmitted through the mails, has in many instances been the medium of infection."*

That a contagious principle does exist, by means of which these different diseases are disseminated among communities, affecting now individuals, and again producing widespread epidemics, is clearly shown in the very admirable article on this subject by Dr. West.

He says: "Facts, such as the absence of measles for the period of thirty years from the Cape of Good Hope, and its development after the arrival there of a vessel from Europe, in which several cases had occurred during the voyage, substantiate the correctness of this opinion. The strongest proof of it, however, is afforded by the circumstances in which measles prevailed in the Feroe Islands, in 1846, after an interval of sixty-five years. They were then introduced into one of the islands by a workman, who leaving Copenhagen on March 20th, reached the Feroe Islands on the 28th, apparently in good health, but fell ill with measles on April 1st. His two most intimate friends were next attacked, and from that time the disease could be traced from hamlet to hamlet, and from island to island, until 6,000, out of a total population of 7,782, had been attacked by it; age bringing with it no immunity from the contagion, though the disease was found to spare all who in their childhood had suffered from it at the time of the previous epidemic."

The closer commercial relationship of to-day, between all countries, which includes even the most remote islands of the sea, makes a similar observation now impossible. It renders such a fact as this all the more interesting, and places it in the same category of unique observations as those afforded by the fenestrated stomach of Alexis St. Martin, for the study of gastric digestion. It shows that these eruptive fevers are only

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*J. L. Smith.

peculiar to infancy and childhood, because few children reach maturity without having had them, and not because there is in early life any special or peculiar susceptibility to their influence. At least, it shows that this is the case with measles, and renders it extremely probable that the other affections of an eruptive and contagious character are so also.

All that can be said at the present day with regard to the etiology of these diseases, is, that each is produced by and gives rise to a subtle and destructive poison of variable intensity and tenacity, which tends to perpetuate itself by affecting susceptible persons, who may in turn communicate it to others through various media, such as the bodily excretions and emanations, and by contact and fomites—the latter being, in the judgment of many, the chief source of epidemics.

CHAPTER II.

MEASLES (RUBEOLA; MORBILLI).

Definition.—Measles is the most contagious of all the exanthems. It affects the vast majority of mankind in all civilized countries. It is an acute contagious and epidemic disease, commencing with all the usual symptoms of a catarrhal cold, having a characteristic rash which lasts from three to five days, and terminates with a mild desquamation. It is strongly epidemic in its tendency, so that its frequency varies greatly at different times. It attacks a far larger number of people than scarlet fever, but the mortality resulting from it is very much less. It is equally prevalent in both sexes, and but rarely affects nursing infants under six months of age.

Mode of Infection.—The contagious principle is most active during the catarrhal stage, and continues in a less active form through the stage of desquamation. It may be carried in fomites, but not so generally as scarlet fever.

The stage of incubation is variable, lasting from five or six to twenty days or longer, with an average of twelve. During this period there is nothing to indicate its presence, although most authorities believe that the disease commences to exert its influence in the system from the moment of infection, and that during the period of seeming latency, it is gathering force which finally breaks out into recognizable symptoms. The activity of the contagion during the catarrhal stage, when the symptoms are those of an ordinary cold, and the children so affected are not suspected to have measles, is one reason of its wide diffusion through communities. At this time, the cough, the breath and the mucous secretions are all infectious, and probably the emanations from the cutaneous surface also.

Symptoms.—The disease is divided into four stages: first, the stage of incubation; second, the prodromal, or stage of invasion; third, the stage of eruption; and fourth, the stage of decline or desquamation.

Stage of Invasion.—At a period, which, as has already been stated, is variable, the rubeolous poison manifests itself; first by a catarrhal inflammation of the mucous membrane of the respiratory organs. The symptoms at first are indistinguishable from those accompanying an ordinary coryza. There may

be shiverings, headache, loss of appetite, languor, and in young infants, convulsions.

In the majority of cases these manifestations are exhibited in a mild degree only, and the symptoms are not so grave as to interfere with school or pastimes. There is more or less cough, at first dry and tight; afterwards loose and rattling. As the disease progresses, these catarrhal symptoms become more pronounced. The mucous membrane of the eyes, nose, throat, larynx, trachea and bronchial tubes becomes involved. Frequent sneezing and cough are nearly always present. The conjunctivas become reddened and congested, and there is more or less photophobia with lachrymation. The discharge from the nasal passages, which are inflamed and swollen, is at first thin and watery, but soon becomes abundant, thick and muco-purulent in character.

Sometimes the cough becomes croupy, and the swelling of the mucous membrane of the larynx causes embarrassment of respiration. In rare and exceptional cases edema of the glottis occurs, and constitutes a dangerous complication.

Nausea and vomiting are often present, but occurring in this stage of the disease, do not, as a rule, constitute alarming symptoms. Sometimes there is epistaxis.

The intensity of the disease varies greatly in different epidemics, and the severity of the attacks and their complications depend to a considerable extent on age, constitution, hygienic conditions, season of the year, and previous state of health. Sporadic or isolated cases are usually milder than when the disease is prevailing in epidemic form.

The fever which accompanies this stage is usually not intense, and in very mild cases may be altogether absent.

In severe cases the temperature may go as high as 102°, or even 104° Fahr.

Stage of Eruption.—On the third or fourth day after the catarrhal symptoms first manifest themselves, the eruption appears, showing itself first on the forehead, temples and cheeks, and soon extending to the face, breast, trunk and extremities. From twenty-four to thirty-six hours are occupied in the development and extension of the eruptive process. The eruption at first appears in the form of minute red spots, resembling flea-bites, and are coarsely scattered over the surface, but they rapidly increase in size and number and become distinctly papular, with the papules flattened on top. If the tips of the fingers are passed over the surface, the latter feels uneven and rough. The papules incline to coalesce in the form of a half-circle or crescent, and are of a deep red or purplish color. Between the spots, in many places, are small areas of

skin of normal color. The confluence of the papules, which is more marked on the face, neck and forearms, gives to these portions of the body a peculiar blotched and swollen appearance. By the end of the second day of the eruption and the sixth day of the disease, the latter is at its height. By this time the eruption has extended to all parts of the body, but is more marked in some portions than in others. The fever does not abate on the appearance of the eruption ; both it and the cough, which were present during the stage of invasion, continue without change, and remain so during the subsequent two days, at which time the eruption begins to fade, the fever diminishes, and the catarrhal symptoms decrease. The bowels are usually constipated in the outset, but as the eruption subsides diarrhea is very apt to show itself.

Enlargement of the cervical and submaxillary glands is not uncommon. The tongue is lightly coated throughout the disease, but remains moist. After the eruption has lasted about four days, or on about the eighth day of the malady, all of the symptoms above described moderate, save one, and the fourth or last stage is reached. The only one of the symptoms to persist is the cough. The cough, which, as we have seen, was the first symptom to appear, is the last one to disappear. It sometimes continues for some weeks after all other symptoms have subsided. After the eruption has faded from the surface, it may still be seen for a number of days underneath the skin, to which it gives a peculiar mottled appearance.

If the child becomes overheated from any cause, this mottling shows very plainly. Notwithstanding this, and in spite of the persistent cough, the patient rapidly regains appetite and spirits and is soon in ordinary health. The stage of decline is marked by a fine desquamation of the cuticle, which continues sometimes for several weeks, but is not so extensive and apparent as is observed in scarlet fever. It is usually greatest where the eruption was most intense.

Irregular or Atypical Measles.—We have described measles as it appears in its usual or typical form. But it does not always pursue this regular course, and like all of the other eruptive diseases, is occasionally seen lacking some one or more of its ordinary symptoms. Thus, we have exceptional cases now and then, where there is a distinct history of exposure to the contagium of measles, and in due time an illness, which is unmistakably due to this exposure, but in which there is a marked variation from the ordinary run of symptoms. We may meet with cases in which the catarrhal symptoms are absent, or present in so slight a degree that the disease is termed

morbilli sine catarrho. In such cases the eruption occurs without premonitory symptoms, and with this exception, the malady is attended with the ordinary phenomena. There are other cases in which the catarrhal symptoms are well expressed, but the eruption is scanty or entirely absent. Such cases are styled *morbilli sine exanthemati.* Again, there are cases where the eruption remains on the surface for an unusual period, or where it is much darker and thicker than common.

In the latter case, the disease is termed *black* or *malignant* measles. Here the eruption is confluent, and there is extravasation of blood with great depression of the vital forces. The temperature runs very high, the pulse becomes very rapid and feeble, the extremities are cold, and the patient may speedily drift into convulsions or coma. This type of measles is very fatal, and death may ensue before the eruption has been fully established. It occurs most frequently in cachectic subjects, whose constitutions are more or less racked or broken by previous illnesses, or in crowded tenements where the surroundings are peculiarly bad.

Complications.—The course of measles is very apt to be complicated with some other affection which is usually an inflammation of some portion of the mucous membrane, either of the respiratory or alimentary tract.

In measles, the mucous membrane is always involved, more or less, and the inflammation only constitutes a complication, when so intensified as to give rise to grave or dangerous symptoms. Diphtheritic inflammation of the fauces sometimes occurs, and is a serious complication, especially when it extends into the larynx.

Stomatitis, of varying severity, is a common attendant on measles, especially in the very young, and gangrene of the mouth may occur as a complication or as a sequela.

When conjunctivitis is attended with a purulent discharge, which threatens the cornea, it is to be regarded as a complication. Inflammation of the pharynx may extend up the eustachian tube, and involve the middle ear, producing otalgia, catarrhal inflammation or deafness.

Enteritis is a very common complication, and is apt to run a protracted and dangerous course.

The most common and most serious of the complications of measles, are capillary bronchitis and pneumonia.

If, on the seventh or eighth day, when the febrile symptoms ought to abate, there should be an elevation of temperature, with the face swollen and the lips dry; if there be present an increased frequency of respirations and pulse; wandering or delirium during sleep, and especially if auscultation reveals fine

crepitant or subcrepitant râles, we may feel sure that we have catarrhal pneumonia or capillary bronchitis to deal with as a complication. As will be seen in a succeeding chapter, these two affections are practically one and the same thing—a distinction without a difference. Lobar pneumonia will present pretty much the same train of symptoms, with the exception that the dyspnea is not so great, while the dullness on percussion is greater.

Carditis and rheumatism are not uncommon as either complications or sequelæ.

Diagnosis.—It is usually difficult, during the stage of invasion, to discriminate between measles and an attack of coryza or bronchial catarrh. The history of the case, if it points to an exposure to measles, may help to the formation of an opinion; but otherwise the diagnosis must remain uncertain until the characteristic eruption appears. Even then, the disease may be confounded with some one or other of the exanthems, such as rötheln, scarlet fever, variola, varicella or typhoid fever.

A careful study of the characteristics of each of these diseases will generally be sufficient to make a diagnosis clear. It is best, however, in many cases, to reserve a positive opinion until the symptoms have had time to completely declare themselves, meanwhile exercising proper care to protect other individuals from exposure, who have not had all of the exanthems previously.

The disease with which measles has been most frequently confused is probably variola. In the latter disease we frequently have catarrhal symptoms, though usually less marked than in measles. During the first twenty-four hours, the two eruptions are very similar in appearance, but in a few hours more, the eruption in variola becomes beady and the papules have a distinct elevation, which is perceptible to the touch when the hand is passed over the surface. Besides this, in variola the active symptoms abate as soon as the eruption declares itself; the pain in the back, the fever, the headache, all disappear; while in measles, the fever and all of the acute symptoms continue without change.

In measles, the eruption remains papular throughout its course and never becomes vesicular, while in variola, the papules soon become vesicles, and then pustules.

In typhoid fever we have an entire absence of catarrhal symptoms, and the petechial eruption peculiar to it, and which sometimes slightly resembles that of measles, does not appear until the seventh day, while in the latter disease it appears on the fourth day.

Sequelæ.—It is a very common thing to hear of some chronic

derangement in patients we are called to treat, as dating from an attack of measles. Otorrhea, strumous ophthalmia, enlargement or suppuration of the cervical glands, chronic diarrhea, croup, tabes mesenterica, are all recognized as liable to follow in the wake of measles. But they are complications that are largely avoidable by proper care and attention during the course of the disease and during convalescence.

It is never safe for a child, who has suffered from any of the eruptive fevers, to be exposed to cold or dampness until several weeks have elapsed after all signs of the disease have vanished. Among the sequelæ of measles, *phthisis pulmonalis* must not be forgotten. Among all the eruptive fevers, there is none so prone to fire up a latent dyscrasia as measles. A child of delicate organization, in whom there has been a suspicion of struma, should be watched with the greatest care while passing through, or convalescing from, this disease. The greatest danger is during convalescence. An irregular thermometry, after the eruption has faded, should be regarded with grave suspicion and frequent opportunity should be utilized in making a careful examination of the lungs, in order to detect the first evidences of breaking down of the lung structure.

In cases where there has been considerable bronchitis or pneumonia, the diagnosis of incipient phthisis will usually be attended with difficulty; but the dangerous tendency of the disease should be remembered and every care taken to avoid surprise.

Prognosis.—In general, the prognosis in measles is good. In private practice, when the surroundings are wholesome and the child can have good care, and when the disease occurs in a patient of fairly good constitution, there is little danger to be feared; but in children of a strumous habit, or whose system is broken down by a previous disease, as whooping cough or malaria, the disease is not infrequently attended with a fatal issue. Sometimes during epidemics of measles, a strong and healthy child will be attacked by the disease in a malignant form, and will perish in spite of every care and attention.

In crowded tenements, where but little care of an intelligent kind is given to the sick, and where every sanitary law is violated, measles is a very serious and fatal malady. So too, in camps where patients are exposed to the vicissitudes of the weather, the disease is attended with alarming fatality. The African race does not endure the disease well. The writer had an extensive experience with colored people while in the hospital at New Orleans, during the war of the rebellion, and found that measles was nearly, or quite, as fatal among them as variola is among the whites. They contract bronchitis or pneu-

monia very readily, probably owing to exposure and a lack of care.

The prognosis is favorable in cases that run an even and regular course, and is grave or serious if complications intervene, such as bronchitis, pneumonia, diphtheria or laryngitis. Entero-colitis and dysentery also add to the danger, but do not always, by any means, portend a fatal issue. The continuance of fever after the disappearance of the eruption always indicates a complication, and should suggest a reserved prognosis. The occurrence of convulsions, if at the beginning of the eruption or during the premonitory stage, is not a complication of any great moment. It does not commonly indicate unusual severity or serious complication. When convulsions occur later in the progress of the disease, however, they nearly always point to a fatal termination.

Treatment.—The disease being self-limited in duration and non-preventable, when once the contagium has been encountered by a susceptible subject, there is little need of treatment when it runs a benign course, in a person otherwise healthy. It is only in cachectic individuals, whose systems are debilitated, or when the natural course of the malady is modified or intensified by what are denominated "complications," that drugs are either useful or necessary, In cases, however, where the pyrexia is high and attended by restlessness, *aconite* may be given. If convulsions threaten, *gelsemium*, *cuprum*, *veratrum vir.*, or *passiflora* may afford relief ; if cephalalgia is intense, *bell.;* if eruption is delayed, or only partial, *bryonia.* For the characteristic cough, which is nearly always troublesome, there is no remedy of equal value with *pulsatilla.* This drug is also useful in developing the eruption, and in controlling the irregular tendencies of the disease, should they be present. For the ordinary diarrhea, which is commonly present at some stage of the disease, no remedies are needed. It should be allowed to pursue its course unless excessive in duration or frequency. In the latter case *ipecac*, *aloes*, *mercurius* or *nux vomica* may be called for. If the diarrhea becomes dysenteric, the usual remedies described under that head should be given. If the cough does not respond to pulsatilla, but becomes dry and tight, give *phosphorus* or *tartar emetic.*

The throat affections and those pertaining to the eye and ear should be treated just as the same affections would be if occurring idiopathically.

In ordinary cases the treatment required will be more hygienic than medicinal. The temperature of the sick room should be maintained at nearly as possible at 68° Fahr. It should not be allowed to go below 65° Fahr. nor above 70° Fahr.

If the temperature of the body exceeds 103° or 104° Fahr., there is no possible injury that can result from a tepid sponge bath. The diet should be bland and simple, and adapted to the age of the patient and the condition of the stomach.

Cooling drinks are perfectly permissible and may be acidulated if desired.

The danger from bronchitis and pneumonia should be constantly borne in mind, and suitable precaution taken to avoid them. The danger from these sources is not over until convalescence is fully established, and the patient should be restricted to the house for at least three or four weeks after the eruption has entirely subsided.

The following table of mortality from measles shows the relative frequency of the disease in this city for eight years.

COMPARATIVE MORTALITY OF MEASLES IN THE CITY OF CHICAGO (OF CHILDREN UNDER 5 YEARS OF AGE) BY QUARTERS, FOR EIGHT YEARS, COMMENCING AT 1885, WITH YEARLY TOTALS.

Quarters.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	Total for the eight years.
Winter.....	20	13	145	9	96	5	102	22	412
Spring.....	28	28	149	40	77	17	102	37	478
Summer	24	51	38	52	25	12	41	41	284
Autumn.....	4	34	9	50	6	38	20	85	246
Totals by yrs.	76	126	341	151	204	72	265	185	1420

CHAPTER III.

RÖTHELN (GERMAN MEASLES; RUBELLA; FRENCH MEASLES).

Definition and History.—Besides the synonyms given above, this disease is blessed with many more. It is called by some, hybrid, false or bastard measles; roseola; morbilli sine catarrho; and it is known also by many other appellations, which are needless to mention. This multiplicity of names, which would be enough to embarrass a prince royal, is not due either to the gravity or the dignity of the disease, but to the uncertainty which still exists as to its true nature and origin. So late as 1865, it was by many believed to be a variety of measles. By others, it was thought to be a hybrid partaking of the nature of both measles and scarlet fever. Others, again, considered it a modified form of one or the other of these diseases, but were uncertain as to which it was most closely related. The consensus of opinion now is, that it is *sui generis:* a distinct disease by itself, and in no way related to either measles or scarlatina.

This opinion is based upon the fact—which recent opportunities for study have demonstrated—that epidemics of rötheln prevail without any regard to the existence of cases or epidemics of either measles or scarlet fever, and that it occurs in persons who have previously had both of these diseases. It is altogether probable, in cases of which we hear or used to hear so often, of measles or scarlatina being repeated in the same individual, that one of the attacks was mistaken for the affection under consideration.

As understood at the present day, rötheln or rubella may be defined to be a specific, epidemic and contagious eruptive fever, at times closely resembling measles, and at other times more closely resembling scarlatina, but having an individuality of its own, with peculiar characteristics, which distinguish it from both these diseases. It is a disease to which children are mostly susceptible and one attack of it usually protects the individual from a subsequent invasion. Its most marked peculiarity is a prodromal enlargement and induration of the cervical glands, without tendency to suppuration.

Hitherto the cases which have been seen personally by the

writer, have been so mild and so devoid of complications and sequelæ as to give him the impression that the disease was unworthy of more attention or comment than would be a similar number of cases of mild rubeola. Even the recognized implication of the cervical glands, has been transient and unobtrusive, and he has never seen a case where the attendant symptoms were in any sense alarming or even serious. In the spring of 1892, we had quite an epidemic of rötheln in Chicago, and there was ample opportunity to observe its symptoms and course; but all of the cases in the writer's practice were so mild that but one or two visits were made to them and no notes were taken of them. In a few of the cases the diagnosis was in doubt for a day or two, owing to the close resemblance to either measles or scarlet fever, but as a rule, the cases were pretty clearly defined. There were no fatal cases, nor were any of them attended with either sequelæ or complications.

Dr. William A. Edwards,* who has made an exhaustive study of the disease and seems to have had a very large acquaintance with it, both in hospital and private practice, says that in his experience the mortality is from four to five per cent., and that this death rate is largely due to complications. He also states that the disease is more prone to be epidemic than any of the other exanthems, and a strong tendency to relapse is noted, in which cases, the "disease may manifest itself with all its primary vigor, or it may be attended by a lesser degree of intensity of all the symptoms, particularly the prodromal."

As an illustration of the uncertain and ill-defined character of the disease, Dr. Edwards states that the prodromal symptoms last "from a few hours to a week," and various authorities are cited who state that the eruption appears first on the face and neck; that it is usually seen first on the back and chest, on the breast and arms; while others are equally firm in the opinion that "it comes out all over the body at once."

According to Dr. Edwards, the disease is equally versatile in the color and character of the eruption. "In my own cases," he says, "the rash was multiform in character, more or less confluent, occasionally ill-defined, in color rosy or pale red. A few cases of the brightest scarlet and some purplish tints were observed. The rash was punctated; small macules were noted; over the more vascular parts, the rash was sometimes elevated, producing a rough skin easily detected by the touch. The patches were very irregular in outline, shape and size, the last factor being the most irregular. The center of each patch was much higher in color than any other part. . . . The total

* "Keating's Cyclopedia of Diseases of Children," vol. 1, page 684 *et seq.*

duration of the rash is much influenced by the character and type of the epidemic, and has been variously reported by different observers. The average duration in over two hundred cases of my own, was five days. In this series, the shortest was scarcely two days, and the longest of all the cases was fifteen. . . . Sore throat was always present in my cases, and enlargement of the tonsils to a great extent. Many of the cases also presented marked pharyngitis and dysphagia.

"Enlargement and induration of the cervical, post cervical and post auricular glands, were present during the eruptive stage; occasionally only one or two were affected, in other cases the entire chain. This we may consider one of the most diagnostic signs of the disease."

Diagnosis.—From what has been said, it is evident that a disease which holds so loosely to a type as this; that shows itself so differently at different times to the same observer, and is described so differently by various authorities, must be at times very difficult to diagnose. It is apparent that the disease often presents symptoms very closely resembling measles, and again very like scarlatina. In severe cases the complaint is ushered in with shivering and febrile disturbance, headache, pains in the limbs, sore throat, redness of the pharynx and tonsils, and in some instances nausea and even vomiting. In addition to these symptoms, there is catarrh, cough, sneezing and coryza. All of these symptoms are like those of measles. But there are cases where the swelling of the throat and tonsils and the white, coated tongue, followed by redness and raised papillæ, show a remarkable likeness to scarlet fever. But the premonitory fever and coryza, instead of lasting three or four days as in common measles, seldom lasts more than twenty-four hours before the rash makes its appearance. The temperature, even in severe cases, does not range as high as in either measles or scarlatina. In the latter disease the nausea and vomiting are common, in rötheln occasional only. In rötheln, swelling of the cervical glands is nearly, or quite universal; in scarlet fever, occasional only.

The diagnosis of rötheln is aided somewhat by its strongly marked epidemic character. Isolated cases of it are rare. This is not true, to the same extent at least, of scarlet fever. In my own experience, the eruption of rötheln is more scattered and more of a rose color than measles, and not nearly so likely to become confluent.

All of the symptoms are of mild type, as compared with the diseases which it so closely resembles. The mild character of the attack; the swelling of the cervical glands; the more rapid progress of the disease from stage to stage; its presence in

epidemics rather than in sporadic form, are generally sufficient to make a diagnosis fairly easy, except in rare instances.

The following letter from Dr. Hedges, who has had a very large experience at the Chicago Half Orphan Asylum, extending over a great many years, is inserted here, in order to give emphasis to what has already been said.

MY DEAR DR. TOOKER — In reply to your questions as to rötheln would say—

(1) Have never had a fatal case.

(2) Have recently had a serious case—do not remember another.

(3) The enlargement of post-cervical glands has lasted for sometimes a week or ten days; quite obstinate, and relieved by calc. iod.

(4) The only pathognomonic symptom I depend upon is the enlargement of the post-cervical and sub-occipital glands. This occurs *early* in the disease, often becoming a real adenitis; otherwise the slight or absent catarrhal symptoms, paleness or brownness of eruption, and low fever, absence of cough, generally outlined the case, and decided the diagnosis in my mind.

Hope these few notes may be of some service to you. Will say in closing that it took an observation and experience of *years* to enable me to feel sure that "German measles" was anything at all different from measles (rubeola). So many times we are told, "My child *has had measles*, and how can he have them again?" The presence of a distinct and different exanthematous disease from measles and very much like it will explain the cases where they have had it *twice*.

Fraternally, S. P. HEDGES

From an interesting paper by Dr. Charles W. Townsend, of Boston, in the *Archives of Pediatrics*, April, 1890, we extract the following conclusions:

(1) Epidemics of measles occur in which many of the cases exactly resemble cases described as rötheln.

(2) That these cases are also found occasionally in severe epidemics of measles.

(3) That glandular swellings and sore throat are sometimes found in cases of undoubted measles, and are sometimes absent in cases called rötheln.

(4) That the symptomology of rötheln is not distinct from that of measles.

(5) That it is therefore impossible to make a diagnosis of rötheln from a single case.

(6) That the only ground on which the individuality of rötheln rests, is the fact that previous attacks of measles afford no protection from this disease.

(7) That as second attacks of measles do occasionally occur, we cannot, from our present knowledge, make the diagnosis of rötheln, unless—as in the charterhouse and asylum epidemics—we meet with a series of cases in patients, many or most of whom have previously had measles.

(8) That the impossibility of knowing how many second attacks may occur in a given epidemic of measles makes this proof of the separate existence of rötheln somewhat problematical, and gives rise to the question, is it possible that in some epidemics, and not in others, a mild form of measles attacks equally those who have had measles before, and those who have not, and affords afterwards no protection from measles? In other words, is rötheln merely a mild form of measles?

Treatment.—But little need be said under this head. Ordinarily, the disease is so mild and innocent that only precautions need be taken to prevent suppression and avoid complications. The same hygienic measures may be observed as in measles. The remedies will have to be selected with reference to the symptoms as they appear. Severe cases may require close watchfulness and judicious medication, but ordinarily no medicine will be needed, and none should be given unless it is needed. The diet should be restricted to bland and unirritating foods, and the bowels, if constipated, should be moved by enemata or suppositories.

CHAPTER IV.

SCARLATINA (SCARLET FEVER).

Definition.—Scarlatina is an acute, contagious and infectious disease, having a distinct and characteristic eruption, which is more or less diffused over the entire surface, and is accompanied, *in all cases*, with fever and an *angina of greater or less intensity*. It is most prevalent between the ages of two and seven years, but no age is absolutely exempt. Infants are sometimes born with it and the aged sometimes die with it. Infants at the breast are rarely affected, although they may be in exceptional cases. It is strongly inclined to run an irregular course and is so often followed by sequelæ, that its duration is always uncertain. Epidemics of scarlatina are very common, but its epidemic character is not so marked as either measles or rötheln.

Individual susceptibility has much to do with its prevalence; and yet the infective poison has such vital tenacity and such diffusability that it may be carried to long distances by fomites, which may retain their contagious properties for months or even years. In the intensity of its virulence it is the most variable and uncertain of all the exanthems. In all but the mildest cases, the eruption is followed by desquamation of the cuticle.

History.—According to Dr. Murchison, "scarlatina" is said to have been the vernacular name for the disease on the shores of the Levant, and was first adopted in a medical work by Prosper Martianus, another Italian physician, who, about the middle of the sixteenth century, also described the disease as distinct from morbilli. Epidemics of scarlet fever were first described in England by Sydenham, in 1676, and about the same time in Scotland, by Sir Robert Sibbald, physician to Charles II. It is thought to have been brought to this country by means of European shipping, about the year 1735, and from that time it has kept pace with the westward progress of civilization until, at present, there are few, if any localities, in the United States, which it has not invaded.

Varieties.—There is no disease with definite characteristics, which holds to a type so loosely as scarlet fever. As a rule spo-

radic cases are mild, and even epidemics have occurred in which all of the cases were so uniformly mild that it seemed either to be losing its virulence, or that advanced methods of treatment had shorn it of its terrors. Thus Sydenham, who saw only mild cases, considered it an "ailment," and unworthy the name of a "disease," and Dr. J. Lewis Smith mentions the case of a distinguished physician, of New York City, who treated a large number of cases in one of the hospitals without a single death, and a few months later lost his own son, who died of a virulent attack of the same malady. In many cases the disease itself seems to run a simple and typical course, and to be devoid of danger, when, just as convalescence is begun, or seems to be well established, some of its characteristic complications or sequele set in which at once change the prognosis from favorable to grave or hopeless.

In other epidemics—and these are most common—many of the cases run a simple and discrete course, and terminate without serious sequele; while side by side with such cases, there will be others of the gravest character, which either suddenly end in death or leave the patient with chronic ailments of serious nature and portent.

For these reasons it has been found expedient to describe the disease under different classifications, such as regular, irregular and malignant. As this arrangement seems to be the most simple and plain, we shall adopt it and describe the peculiar features of the affection under these several headings.

SYMPTOMS OF REGULAR FORM.

The disease usually begins abruptly, attacking the child in the midst of perfect health. It rarely begins at night, or exhibits its initial symptoms during the hours of slumber. More often the victim sleeps as well as usual during the night preceding the attack, but arises in the morning at the usual time, with a feeling of nausea, which is speedily followed by vomiting or empty retching. A fever of greater or less intensity ensues, and the child feels profoundly ill. At this time a careful inspection of the fauces will generally discover an angina, and if the child is old enough to explain its symptoms, will complain of pain on swallowing. In severe cases, where the throat is principally affected, there is danger at this period of mistaking the disease for a simple angina or diphtheria. The fever, however, is usually higher in scarlet fever than in either of these affections, while the vomiting is well-nigh pathognomonic. After a few hours—varying from three or four to eighteen or twenty-four—the characteristic eruption makes its appearance, first on the

face, the forehead, the neck and breast and clavicles. About the mouth, the skin has a peculiar pallor, from the contracted capillaries. The eruption is fine, quite uniformly diffused over the affected surface, and is intensely scarlet in color. While at a distance the skin looks smooth and evenly affected, a close inspection shows it to be finely punctated, with here and there lines or small areas of normal color. From the face and neck the eruption quickly diffuses itself, so that within twenty-four hours, or sooner, it has extended itself over the entire body. The color is not equally intense, however, being most so over the back and buttocks, and on the inside of the thighs, where the hue is deeply scarlet. The rash disappears on pressure, but reappears as soon as the pressure is removed. If the finger be drawn along the back of a well-marked case, it will leave a white line in its wake, which quickly disappears as the redness returns.

A tardy return of color under these circumstances indicates a sluggish capillary circulation, due generally to nervous depression, and is not a good symptom. It is so found in grave cases, where the eruption is dull or dusky in hue. In some cases the eruption reaches its maximum intensity during the second day, but in others not until the third or fourth day. During the eruptive stage, the skin is dry and sensitive as well as hot, and the countenance has a puffed and swollen appearance; but this is not usually so marked as it is in measles. The tongue is generally coated from the beginning, but this coating becomes more thick and pasty as the disease progresses, until on the second or third day it melts away, leaving the red and swollen papillæ standing up prominently over its surface, constituting the strawberry or mulberry tongue, which is one of the pathognomonic symptoms of the disease. This thick coating of the tongue and its papillary studding, its quick melting away, like snow in springtime, leaving the raised and red papillæ, is rarely if ever seen in any other disease, and is so characteristic as scarcely to elude notice. It should be said, however, that this typical tongue is not always so marked as to be depended upon for diagnosis in otherwise questionable cases. Like all other features of the disease, this one is subject to all sorts of vagaries, but when present it is, as before stated, "pathognomonic."

The vomiting or empty retching is of little or no significance when occurring as an initial symptom. It occurs perhaps in three-fourths of all the cases, irrespective of gravity, and means nothing more than a sympathetic irritability of stomach, showing a derangement of the nerve centers of the sympathetic system. If this vomiting is persistent, however, or recurs after

the eruption has manifested itself, it is a matter of the gravest import.

It is by no means rare for convulsions to occur, as among the first symptoms of scarlet fever, especially with infants and young children of nervous temperament. Convulsions, like vomiting, occurring early in the disease, and preceding or accompanying the eruption, are of no special significance. They do not indicate malignancy, nor do they point to any special complication in the absence of other symptoms, referable to special organs. When convulsions either begin *after* the rash has made its appearance or having begun earlier, persist after this period, they are of grave import and indicate a serious poisoning of the nerve centers. The brain is not apt to be seriously involved in simple scarlatina.

Among the initial symptoms, it is common to find dilated pupils, and an excited state of the cerebral functions. The mind is excited and in a state of exhilaration, in spite of profound bodily exhaustion.

General physical weakness is the rule even in mild cases, but the mental condition varies greatly according to temperament and previous state of health.

A mild delirium is frequently noticed during sleep, which is quite peculiar to the disease and which, when present, may help to differentiate the diagnosis. This delirium is most noticeable during the first night or two, and seldom lasts more than three nights. It strongly resembles the "night terrors" of childhood, and is of only momentary duration. The child, for example, wakes out of a quiet sleep, and for a few moments, talks incoherently, fails to recognize its mother or other attendant, cries and calls for some person or thing already within its reach. It does not seem to know where it is; wants to be taken home or go somewhere. In another moment the mind clears up and after a drink of water or a sup of nourishment, quiet sleep is renewed, to be interrupted again after an interval of twenty or thirty minutes, by a similar repetition of phenomena. This delirium is quite characteristic of scarlet fever, and is due to an excited or exalted state of the cerebrum, quite different from that produced from other forms of fever. The writer remembers distinctly the dreams and visions which accompanied his attack of this malady when a lad of twelve or thirteen years of age.

In the simple as well as in the severer forms of scarlet fever, there is always more or less sore throat. The angina may be slight, in the mildest cases, but it is present in all. Without sore throat there is no scarlet fever. There may be but a moderate exanthem and a severe angina, and the exanthem

may be intense, and even confluent, with but a moderate amount of angina; but whichever predominates, there cannot be one with an entire absence of the other. The two are absolutely necessary to constitute the simple or regular form of the disease. When the throat affection is mild in the beginning, it usually intensifies as the disease progresses, and reaches its maximum along with the eruption, subsiding as the latter subsides. The temperature is subject to remissions and exacerbations. In the beginning of the disease it is not uncommon for the temperature to suddenly rise to 102° or even to 105° Fahr., and to maintain this intensity during the period of eruption. Sometimes this elevation of temperature is reached at a bound; in other cases it is a gradual rise, while in either case it is apt to diminish gradually with the subsidence of the rash.

Some observers have noticed a peculiarly sweet odor to the breath in cases of scarlet fever, where the throat affection has been slight, but this is probably imaginary; it certainly is not marked enough to attract the attention of many authorities, and is surely not as pronounced as the peculiar bodily odor, which is common enough in measles to attract general notice, especially when many cases are aggregated.

The pulse is generally high from the beginning to the end of the disease. It is not unusual for it to range as high as 140 or 160, even in mild cases, and this rate per minute is frequently maintained throughout the eruptive stage.

The urine is high colored from the first, and is usually scanty, even when the kidneys are not perceptibly affected. It is necessary, however, to keep close watch over the urine, for even in the first few days, there may be detected evidences of renal catarrh, which, if neglected, may eventuate in serious nephritis. These evidences are seen in mucus casts, ephthelia, debris and blood corpuscles, and traces of albumin.

By the second or third day the eruption begins to fade and disappear in the order in which it came.

The flush of the face, which is usually well marked in the first few hours of the fever, is first to disappear. It is not always present even in otherwise well-marked cases. The legs and feet are the last to part with the evidences of its presence. Desquamation, or peeling of the cuticle, next follows; but this is as erratic and uncertain as are all the other phases of the disease. Sometimes desquamation begins as early as the third or fourth day of the eruption, but more often it is not perceptible until the rash has entirely disappeared from the surface. It then shows itself in furfuraceous scales about the neck and hands and feet. On the palmar and plantar surfaces, where the cuticle

is thicker, it loses its furfuraceous character, and is peeled off in patches or strips. The extent of the exfoliations is, in general, comparative to the intensity of the exanthem. When the latter is mild, and the skin soft and delicate, the scaling is branny and slight; when severe, it is lamellar and abundant. A repetition of the desquamative process has been noticed, in which case the skin remains in a sensitive condition for a long period. In any event, and without regard to the extent of desquamation, the skin is left by the eruption in an extremely sensitive state, and this sensitiveness is shared also by the kidneys; so that a slight cold or exposure is apt to be disastrous. This is equally true of mild as of severe cases; indeed, it is a matter of general observation that cases which have been mild and apparently devoid of danger in their early stages, are the very ones most likely to go wrong in the sequelæ. An explanation of this fact might be sought in the mild character of the disease, and the consequent lack of care which severer cases would naturally receive. But this will not explain the clinical fact that mild cases—even the mildest—are so often the subjects of complications and sequelæ, and this in spite of every precautionary effort. This is more apparent in some epidemics than in others. As has already been stated, in some years all cases are so mild, so regular and so uncomplicated as to mislead the inexperienced and the unwary into thinking that scarlatina is a disease of but trifling character—that its dangers have been overestimated, or that new methods of treatment have robbed it of all virulence.

The fact, which has been often exemplified, that serious mischief may be developed speedily and without warning even in the mildest cases, and whether the disease is sporadic or epidemic, should be a warning to the young physician, and should make him particularly watchful and careful until perfect health has been fully established.

IRREGULAR FORM.

The usual sequence of symptoms, in the regular or typical form of scarlatina, as already described, is subject to many variations, both as to intensity and duration, without transcending the limits of this classification; but peculiarities of constitution, pre-existing disease, local surroundings, epidemic influences, errors in management, or other perturbating causes may so disturb the natural or normal course of the disease as to sometimes render the diagnosis difficult, or modify the prognosis in a given case. The febrile phenomena may be greatly

intensified; the exanthem may be either partial or nearly absent; the angina may be accompanied by ulceration of, or exudation on the tonsils; nephritis may develop early, and be the most prominent feature of the disease throughout its entire course; the fever, while moderate in its intensity, may persist, without any apparent cause, beyond the usual limit and be characterized by inexplicable remissions and exacerbations. When the nervous system is greatly disturbed in the course of scarlatina, it may be considered an irregularity, for in its simple form there is no such manifestation. The same may be said of affections of the ear and the brain. Otitis is not by any means a common or necessary accompaniment of the disease in its regular form. In the irregular variety, however, an inflammation may be excited in some portion of the auditory apparatus, and the meninges of the brain may also be involved. The lymphatic and glandular structures are very prone to become implicated, and when this is the case the inflammatory process may progress to the formation of abscesses. When scarlatina occurs in a child already affected with entero-colitis, the eruption is apt to be delayed or may be suppressed altogether. When entero-colitis occurs in the course of scarlatina, it is very sure to modify its symptoms in one way or another. If occurring early in the disease, the eruption quickly recedes, and may not again manifest itself. Whenever the eruption is either delayed or suppressed, or disappears prematurely, and this state of affairs is accompanied with an aggravation of the fever, it constitutes a very grave condition.

At any stage of the disease the regular may be suddenly transformed into the irregular form, and this, without any cause with which science is familiar. A case which may have been going on in the most straightforward manner, with a typical temperature and every symptom indicative of a favorable outcome, may thus take on irregularities of one kind or another, and in a few hours assume features of the gravest import. This may occur independently of any perceptible local affection, and so far as we are able to judge may be independent of any constitutional dyscrasia.

With our present knowledge, it is difficult to understand these clinical experiences, and we can only say that it seems to be due to the perverse and erratic nature of the disease, irregularity and pathological surprises constituting one of its chief characteristics. It is absolutely impossible to indicate all of the deviations and incidental derangements which may accompany an attack of scarlatina. The physician should understand this, and be prepared for such emergencies, however suddenly they may arise.

MALIGNANT FORM.

Fortunately this form of scarlatina is not nearly so common as those which have previously been described. Some epidemics are peculiarly free from malignancy, all of the cases being comparatively benign and uncomplicated. In most epidemics, however, there will occur occasionally one or more cases of such severity and quick fatality, that the term "malignant" is the only appropriate designation. In such cases the nervous phenomena are intense; the initial symptoms may be attended by convulsions, which rapidly result in coma and death. The fever is high from the commencement, with headache and delirium. The temperature may rise to 105° or even 107° Fahr. at a bound, and continue at this height for one, two or more days, when death usually takes place. Sometimes in these malignant cases, the eruption never finds outward expression. The disease comes on like an explosion. Its dangerous, if not fatal character is apparent from the onset. Some of these malignant cases are markedly adynamic in character, great exhaustion of the vital forces being an early and conspicuous feature. In others the symptoms are most violent and appalling. In the latter, the delirium very soon drifts into a fatal coma. In some instances the stupor or coma is interrupted by spasms of longer or shorter duration. When cases, which show this malignant character at the beginning, do not reach a fatal termination in the first twenty-four or forty-eight hours, there is apt to be a lull in the symptoms and a return of consciousness, with an abatement of fever and a diminution in the rapidity of the pulse. Sometimes this remission is of permanent character, the disease takes on a milder form and health ultimately results. But more often, when the initial symptoms have been thus violent, the apparent improvement is illusory and temporary. The system is broken by the virulence and malignancy of the attack and the recuperative powers are inadequate to withstand the shock. In some cases, after the subsidence of the violent symptoms, which marked the onset of the malady, and just as the improved condition has stimulated hope, new phenomena present themselves, which show how deeply as well as suddenly the scarlatina poison has permeated the system. These phenomena are manifested in severe inflammations of the fauces, membranous deposits on tonsils, or inflammation and induration of the lymphatic glands and cellular tissues about the neck All of these manifestations are more serious than if occurring idiopathically, for they are not mere surface indications—not trivial congestions of unimportant organs, but indicate a poisoned state of nerve centers and

a consequent derangement of cell structure. There is a fateful undermining of the very center of life, as if a poisonous flood had swept over the organism.

When life in these cases is not instantly imperiled or when there is an effort at reaction from the nervous shock, sufficiently strong to give opportunity, this flood of poisonous material is prone to show itself in a purulent and abundant coryza or in a catarrhal angina, and also in a destructive otorrhea.

In grave or malignant cases of scarlatina, all of the essential symptoms which constitute the disease are liable to be intensified, or appear out of their usual order or sequence. In one case the nervous phenomena may be paramount; in another the throat symptoms may overshadow all others, constituting the anginose variety of scarlatina of some authors. In still others, the eruption may be so extensive and confluent as to quash the exhalant function of the skin, and thus produce the same effect as would result from a burn of equal extent. Uremia to the extent of intoxication is another of the accidents or effects which is liable to occur in these cases of malignant disease, when the kidneys, instead of the skin, are principally affected. It occasionally happens that a malignant case of scarlet fever does not show its malignancy at the outset, but starts off in an apparently benign, but somewhat irregular way, and only takes on a severe character after several days have elapsed after the initial symptoms have exhibited themselves.

In these cases, however, there are eccentricities manifested that should excite apprehension. There is not a full and general diffusion of the eruption. It appears in patches, and is bluish rather than scarlet.

There is good ground for the popular domestic idea that there is safety in having the "rash well out." If the disease does not find full expression on the external surface, it is quite sure to find it elsewhere, on the mucous surface, or oftener still, in the excretory glandular system.

COMPLICATIONS AND SEQUELÆ.

The dangers incidental to scarlatina are not confined to the initial lesions, nor are they apparent to the closest scrutiny during the early stages of the disease. The erratic nature of the malady, and the variableness of the symptoms excited in its subjects, are not alone responsible for the terror with which the laity looks upon an invasion of scarlatina into its midst. When the disease runs a mild course in an otherwise healthy child, it means merely a week's illness and a week or so of comfortable

convalesence. Multitudes of cases occur so benign in character, and so devoid of all signs of danger, that one might, like Sydenham, think it scarcely worthy of consideration. But anything like an extensive experience with its peculiarities will divest one of all feelings of security, and confirm the general feeling of dread and apprehension with which it is everywhere encountered. Severe cases are always dangerous. Mild cases, as already pointed out, are liable to take on serious aspects at unexpected moments. But probably not one-half of the mortality in scarlatina results from the *direct* effects of the disease. The other half of the mortality can be attributed to the effect which the disease produces on latent tendencies, constitutional defects, or remoter results of the scarlatinous poison on essential organs, which were not recognizable during the legitimate course of the disease.

Symptoms.—It has heretofore been stated that inflammation of the faucial surface is a general, if not necessary accompaniment of scarlet fever. It is possible that, as some authorities state, cases do occur without any evidence of throat affection whatever; but to the mind of the writer such cases are very questionable, and cannot properly be regarded as scarlatinal unless indubitable evidence is present of exposure to the contagium and other evidences are found of distinctive character, on which to found a diagnosis. As a rule, to which there are few if any exceptions, there is more or less angina. It usually precedes the efflorescence on the skin, and may sometimes be detected some hours in advance of the latter.

In the anginose variety of scarlet fever the throat symptoms are severe. There is pain on swallowing; the whole faucial surface is inflamed and infiltrated; the tonsils are swollen and painful—usually more so on one side than the other, but occasionally on both; the secretions are more abundant than normal and are foul in character. When the sore throat, however mild or intense, appears in the beginning or early stages of the affection; it is to be regarded as a natural accompaniment of the disease; but when, as sometimes happens, a true diphtheria is developed, with its characteristic, deeply imbedded exudate and other well-marked features, it is not a natural part of the malady, but is a complication and one that is greatly to be dreaded. So also if the inflammation, swelling and induration of the lymphatic glands and cellular tissues about the neck, which are among the common accompaniments of severe cases, extend to the throat so as to embarrass respiration and threaten edema of the glottis, such a condition would be a complication. In scrofulous subjects the disease is apt to be complicated by abscesses and by involvement of the mesenteric glands.

Purulent catarrh of the posterior nares, otorrhea, otitis, synovitis, and endocarditis are occasional complications. Pleuritis is more common than bronchitis or pneumonia.

Among the sequele of scarlatina, dropsy is by far the most common, as a result of acute nephritis. It may affect the serous cavities and the internal organs and cause edema of the lungs, ascites, hydrothorax, hydropericardium, or hydrocephalus; but it is much more apt to attack the sub-cutaneous tissues, when it is known as *anasarca.*

It is stated by most authorities that anasarca is present in about one-fifth or one-sixth of all cases, but in the experience of the writer this is gross exaggeration. We have notes of fifty-three cases in our case books, in which dropsy in any form is mentioned as complicating the disease in only three instances. Anasarca usually occurs in the course of the second or third week of the disease. It rarely shows itself before desquamation has begun, and more often toward the end of this process. It follows mild or moderate more often than severe cases, and is commonly attributed to the influence of cold; but this is probably an erroneous opinion, for it happens quite as often as otherwise, in cases where every precautionary measure has been taken. It is doubtless due to changes in the kidneys, induced by some peculiarity in the scarlet-fever poison. Just how these changes are produced and why, are questions hard to answer. When the kidneys are examined directly after a dropsy has occurred, they are found congested, the uriniferous tubules are in a catarrhal condition and an epithelial desquamation more or less extensive is in progress.

Occasionally a croupous inflammation of the tubules is noticed. The morbid processes commence at the malphigian bodies, and extend to the uriniferous tubules. Cloudy swelling of the epithelial cells characterizes the anatomical changes during the first week. Infiltration soon takes place around the tubules, which become stuffed with these clouded and enlarged epithelial cells, or with granular matter, resulting from their disintegration. Sometimes abscesses form in the substance of the kidney (kippox). The first noticeable indication of nephritis is a puffiness of the eyelids; and soon after the face takes on a puffed and bloated look. From the face it extends over the body, and if the anasarca becomes general, it is apt to be attended by more or less ascites.

Previous to the appearance of dropsical symptoms, there is usually an exacerbation of the fever. There is anorexia, restlessness, and perhaps nausea and vomiting. The urine becomes high-colored and scanty, and if critically examined, will be found to contain albumen and exudative casts. It should be

remembered that the great danger from scarlatinous nephritis lies mainly in the failure to discover its presence, until grave symptoms appear. The urine of a child sick with scarlatina should, if practicable, be examined daily as to its quantity, specific gravity, and a frequent test for albumin should be made. Diminution in the quantity of urine generally precedes both the albuminuria and the dropsy, although both are apt to follow quickly thereafter.

If the early symptoms of a renal catarrh be overlooked or neglected, it may speedily become a serious complication, while if recognized in its incipiency, it is usually very amenable to treatment.

In some cases the urinary secretion is totally suppressed, and then the dropsy makes rapid progress; there is more or less headache, sudden and marked elevation of temperature, vomiting more or less persistent, and finally convulsions, coma, and in all probability, death. The convulsions may be clonic or tonic, partial or general.

In mild cases, where the urinary secretion is only partially suppressed, and prompt measures are employed to relieve the local congestion, the anasarca begins to decline after two or three days, the untoward symptoms disappear, and the urine becomes normal.

Diagnosis.—In the majority of cases, the diagnosis of scarlet fever is not attended with difficulty. It is only in exceptional cases, occurring in the absence or incipiency of an epidemic, and where the initiatory symptoms are ill-defined, that a mistake is likely to occur. A sudden attack of fever, especially if occurring in the morning, with more or less angina, is always to be looked upon with suspicion. If the disease is prevalent in the neighborhood, or if there is any history to be had of exposure in a susceptible subject, there need be little ground for doubt. This is especially true of the mild or regular form of the disease.

In the irregular form, especially when the exanthem is scanty, the angina will surely be present, and so also, the vomiting and the fever.

The tongue rarely fails to show its characteristic coating which when present, is pathognomonic.

Doubtful cases occasionally occur, in which cervical lymphadenitis or a mild nephritis constitutes the entire picture. Absence of the prodromal stage; presence of the strawberry tongue; the early appearance of the eruption and its finer character, will serve to distinguish scarlatina from measles. The coryza and the cough are natural accompaniments of measles, but not of scarlatina. In rötheln or German measles,

the eruption is scattered, there is no angina, and the constitutional symptoms are relatively very mild. Erythema and roseola sometimes closely resemble scarlatina, but both lack the characteristic tongue, the angina and the glandular complications. In both the former affections the exanthem is more local and confined to certain portions of the body, while the scarlatinous eruption is more extensive and more equally diffused. A few hours will suffice to dissipate all doubt in these similitudes.

Scarlatinous dropsy is easily distinguished by its acute course, by its beginning about the face and thence extending to the serous cavities, and by its occurring in children, during or subsequent to an attack of the fever. A previous or accompanying desquamation and associate enlargement of cervical glands will still further assist the diagnosis.

For the differential diagnosis the reader is referred to the close of the chapter on Roseola.

Prognosis.—The prognosis in scarlet fever should always be guarded. It is largely influenced by the type of the prevailing epidemic, the character of the attack, the vigor and age of the patient, and more especially by the presence or absence of serious complications.

The development of scarlatinous nephritis is not necessarily, even in its graver forms, a fatal complication. If recognized before renal degeneration has gone beyond restoration, there is no reason to abandon hope. Many of these cases recover, even after convulsions have occurred. At the same time, clinical experience teaches us that all nervous disturbances, and all inflammatory complications increase the danger of the disease. The most trivial complication may quickly alter the aspect of the case, and change the prognosis from favorable to unfavorable. A temperature rising rapidly to 105° Fahr., or continuing for a length of time at or above this figure, especially after the beginning of desquamation, is unfavorable. Pyemia and septicemia are usually fatal. Abundant hemorrhagic extravasations, hematuria, and evidences of the hemorrhagic diathesis, are always signs of an unfavorable prognosis.

Favorable symptoms are: a temperature below 104° Fahr.; a pulse not exceeding one hundred and twenty beats per minute; the absence of serious cerebral and throat symptoms; a fully and regularly developed rash of a bright scarlet color, and a copious flow of non-albuminous urine.

Duration.—In mild and uncomplicated cases the duration of the febrile stage of the disease is from five to seven days. In very mild cases it may be even less than this. But even in such exceedingly mild cases there is no security until after

several weeks have passed, and the patient cannot be considered as out of all danger, until some time after all evidences of desquamation have vanished. Some years ago the New York State Board of Health addressed a circular to the more prominent physicians of New York City, asking them how long before a pupil having had scarlet fever should be permitted to return to school. The answers returned varied from six to eight weeks. For the shorter period at least, the child recovering from scarlatina should be restricted in its intercourse with other children, and should be more or less under observation and care.

Mortality.—Scarlet fever is universally regarded as the most fatal of all the exanthematous diseases. Unfortunately for statistics, there is no strict law in this country compelling physicians to report their non-fatal cases of any of the contagiums. In the large cities a faithful record is kept of all fatalities, but the relative mortality in a given disease is mere guess-work. In the epidemic of scarlet fever which visited Chicago in 1876–7, there were, during fourteen months, eleven hundred and thirty-eight (1138) deaths from this cause. From the number of cases of the disease reported to the health officer, Dr. DeWolff, who was then commissioner of health, estimated there must have been within the city limits, during these fourteen months, from ten thousand to twelve thousand cases, which would give a mortality of about ten per cent. This is about the usual estimate in severe epidemics of wide extent. Dr. Charles W. Earle, of this city, who studied this epidemic very carefully, endeavored to verify or correct these statistics by getting the number of cases treated by the leading physicians. He estimated the number of cases as not less than fourteen thousand. If his figures are approximately correct they would reduce the mortality to about eight per cent. The mortality in sporadic or widely scattered cases is always less than in epidemics and less in the country than in the city. It is always greater in hospitals and asylums than in private practice. It varies greatly with seasons and with the circumstances of life.

In the regular form death is generally due to some complication.

The young physician cannot be too strongly impressed with the fact that scarlet fever, pure and simple, is a mild and self-limited disease, but at the same time it is the most treacherous, the most uncertain, variable and dangerous of all the exanthems. Constitutional defects are especially liable to be developed and cause trouble in the course and particularly *after* the disease has apparently spent its force, and all symptoms seem to be satisfactory. In a word, the sequelæ are ever and always to be more dreaded than the disease itself—and yet these

sequelæ may often be controlled, if not prevented, by early recognition and prompt treatment.

The following table of mortality from scarlet fever, in this city, is not without interest.

COMPARATIVE MORTALITY IN THE CITY OF CHICAGO FROM SCARLET FEVER (IN CHILDREN UNDER 5 YEARS OF AGE) BY QUARTERS, FOR THE EIGHT YEARS BEGINNING 1885, WITH YEARLY AND QUARTERLY TOTALS.

Quarters.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	Total for Quarters.
Winter.....	75	70	66	41	51	74	160	152	689
Spring.....	70	64	39	50	55	42	108	99	527
Summer.....	45	40	57	41	39	30	81	53	386
Autumn.....	89	46	28	52	40	47	150	78	530
Totals by yrs.	279	220	190	184	185	193	499	382	2132

Prophylaxis.—Every case of scarlatina, however mild, is both contagious and infectious, and the attending physician will not have discharged his full duty in a given case, until he has taken every warrantable precaution against the further spread of the disease. During the first few days after the attack, the disease is only mildly infectious. By some it is maintained that it is only so after desquamation has begun. The safest way is to guard against dissemination, as soon as the nature of the malady has been clearly recognized. To this end, the patient should be rigidly isolated; and if possible, a light and well-ventilated room on the top floor of the house should be selected for the temporary hospital, or in case of an apartment, the room should be the one most quiet and free from intrusion. This room should be stripped of all superfluous furniture. Carpets, rugs and hangings should be removed, leaving only those things that are considered absolute necessities. The bedding and linen should be chosen with reference to their destruction after they cease to be needed. Only such books and playthings should be allowed to remain as can be burned ultimately. The patient should be anointed daily or oftener with some unctuous substance, so as to fix the dusty particles of the exfoliating epidermis during desquamation and to prevent their being widely disseminated. For this purpose, olive oil is as good as anything, or mildly carbolized vaseline may be used. A pleasant preparation is made of cocoa butter, scented with almond

oil. This is prepared by some of our city druggists and dispensed under the name of "Unguentum Grecorum."

The attending physician should have a linen duster in an adjoining apartment that he can slip on before entering the sick room and discard after leaving it. The nurses or attendants should not mingle with the well members of the family, until desquamation is completed. When this process is over, and as soon as the attending physician deems it prudent, the patient should be given a bath of warm water and soap, followed by a brisk rubbing with dilute alcohol. For some time subsequently, great care should be exercised to avoid exposure, for a scarlet-fever convalescent is wonderfully susceptible to cold.

As soon as vacated, the sick room should be thoroughly disinfected by the burning of sulphur, after which it should be well aired, the walls newly calcimined or freshly papered, and the woodwork and floors scrubbed with carbolized water and soapsuds. The mattress and bed linen, as well as the body clothing which has been used in the sick room, should be disinfected or destroyed by burning. The use of disinfectants about the room during the illness is of questionable utility.

A well-moistened sheet hung in the doorway is useful in preventing the poisonous emanations from infecting other portions of the house. Carbolic acid or other offensive disinfectants should never be used. Such inodorous preparations as Platt's chlorides or permanganate of potash are far preferable.

As to the value of belladonna internally administered as a prophylactic in this disease, there is some divergence of opinion. The great weight of evidence, however, is in its favor. It is neither a specific in all forms of the disease as a curative remedy, nor can it always be depended upon as a reliable preventive; but there is unquestionable and ample evidence to show that when it does not prevent an attack it modifies and controls its severity. The writer always administers it to the well members of the family, who are not already protected by a previous attack of the disease, and he has never yet seen a severe case of scarlet fever that had previously taken the remedy. As a prophylactic, belladonna should not be given lower than the sixth decimal dilution, probably the twelfth would be equally efficacious. But belladonna is not the only remedy which has been used and highly esteemed by many for its prophylactic powers. Dr. Samuel Lilienthal says in the "Transactions of the American Institute of Homeopathy" (vol. 1880): "What is malignant scarlet fever? It may be answered in two words, albuminuria and uremia; that peculiar kind of blood poisoning resulting from the change of urea into the

carbonate of ammonia; and carbonate of ammonia, or rather the sesquicarbonate of ammonia, has been for ages a favorite prescription in zymotic diseases, with physicians of the old school.

"My friend, Dr. John C. Morgan, of Philadelphia, acknowledged with great satisfaction, that his success in the treatment of this fearful disease arises from the early and steady employment of this salt, a drug perfectly homeopathic to the disease, and thus he prevents that very decomposition of the blood which is the cause of the ammoniemia. Look at the symptoms of the drug, and I doubt whether in our whole *materia medica* there is a drug whose every symptom is so characteristic of this disease. Strong febrile irritation, red diffused spots, with sensation of heat and subsequent desquamation, especially of the trunk, arms, and thighs; inflammatory swelling of tonsils, and of the sub-maxillary glands; angina, with viscid phlegm; putrid sore-throat and gangrene; feeling of great prostration; catarrhal condition of the kidneys and bladder, with scanty and painful discharge; and the thought must impress itself upon our minds, if generalization could be allowed in our school, that the sesquicarbonate of ammonia deserves far more to be used as a preventive than the so-much-vaunted belladonna."

Treatment.—It cannot be too strongly impressed upon the student and the practitioner, that there is no one specific for scarlatina. A disease which is so variable in its manifestations; so eccentric in its course; so full of surprises, even in its mildest form cannot, in the nature of things, be treated successfully in a stereotyped way. In fact there is no disease, unless it be entero-colitis, in which so great a range of remedies is likely to be needed.

The value of belladonna in the regular form of the disease, and especially when the eruption is smooth and the angina of mild type, is very great, and if the cerebral symptoms are in correspondence with the drug, its effect is marvelous. But in the irregular and malignant forms of the disease, there are other remedies of far greater merit. Apis, ailanthus, arsenicum, gelsemium, mercurius and terebinthina, are drugs that will frequently be called for, and will greatly excel belladonna, in their curative effects. In the first onset of an attack, and in the absence of symptoms calling for some other drug, aconite and belladonna will be most commonly indicated. In severe cases, especially when attended with great prostration and typhoid tendencies, rhus tox., arsenicum, veratrum viride, ammonia sesquiox., or solanum, may be required. In cases which show great malignancy, arsenicum, lachesis, ailanthus, and camphor are to be remembered.

Where there is great restlessness, gelsemium will be found of value; for the nocturnal delirium, hyoscyamus or passiflora. On the first indications of dropsy, apis or arsenicum will be needed. The choice between the two remedies will depend on the rapid swelling of the throat, and sharp stinging pains in the fauces; when the rash is interspersed with a miliary eruption, and when with suppression of eruption there is also suppression of urine, all of which symptoms indicate apis. Arsenicum is indicated in malignant cases, when there is great prostration of the vital powers; when there is great thirst, and when there is a fetid discharge from the nostrils (ailanthus).*

For anasarca and threatened hydrocephalus, helleborus nig. is the chief remedy.

But the reader is referred to the following list of remedies and their chief indications, a careful study of which will be sufficient to differentiate.

Aconite.—Intense restlessness; very irritable; skin very hot, dry and congested; face expresses fright and anguish; headaches; intense burning thirst; in stomach in later periods, sudden violent, burning, shooting pains; sweat on whichever side patient lies; severe retching with vomiting of green mucus, mixed with bile or blood.

Ailanthus.—Face flushed and burning; restless, yet at the same time very drowsy, which increases to insensibility, with low, muttering delirium; severe headache with photophobia; eruption of a miliary rash, of a livid color, the intervening spaces being of a dull opaque appearance, in patches, mostly on face and neck; excessive vomiting; tongue dry and cracked; throat dark colored, and in some cases glands are greatly swollen and ulcerated; skin cold and dry; the livid color returns very slowly when pressed out by the finger.

Ammonium Carb.—In malignant cases with lethargic conditions, threatened gangrene; eruption developed but slightly, with stupor, sleepiness, burning pain and dryness of mouth; burning pain in throat, which is sore and exhales a foul odor; parotids and lymphatics of neck, especially of right side, hard and swollen; tonsils enlarged and of a livid color and covered with a foul smelling mucus which rapidly degenerates; excessive vomiting, accompanying threatened paralysis of the brain; head heavy; breathing stertorous; stools passed involuntarily.

Apis.—Unconsciousness, delirium, convulsions, sopor with piercing shrieks, cerebral irritation, gnashes the teeth, shrieks, rolls the head; accelerated and oppressed breathing; pulse slow and irregular; skin changes from hot to cold, or one part hot

* Bryonia will be found very effective in cases where the exanthem is slow in appearing or appearing irregularly.

and another cold; discharge of thick, white, bloody, fetid mucus from the nose; great trembling of the limbs; gradual and constant increase of fever, with frequent changes in character of pulse; swallowing difficult from swollen tonsils; urine scanty and high colored, passed frequently and with stinging pains; entire abdomen sensitive to touch; slimy and bloody diarrhea; during desquamation symptoms of dropsy. According to Wolf, where the virus thoroughly poisons the blood, the whole nervous system is under its paralyzing influence; the fever becomes typhoid in character, the tongue deep red and covered with blisters, which become converted into stinging sores and ulcers.

"Never useful in coryza form, only with dryness of nose and throat and symptoms of hydrocephalus."—*Hering.*

According to O. P. Baer, the indications for apis are, "skin unevenly scarlet and rough, by being covered with hard, sharp, pointed rash." In this form of the disease, he says it is as completely curative as is belladonna where the skin is evenly scarlet all over, smooth and shining.

Apocynum Cannabinum.—Mind bewildered; great thirst, but water rejected soon as taken; abdomen distended and painful; scanty urine with no uneasiness in consequence; profuse light-colored urine with no sediment; general restlessness with debility; excretions generally diminished, especially urine and sweat.

Arnica.—In typhoid conditions, with nose-bleed and bloody expectoration aggravated by coughing; ecchymoses on various portions of the body, or even small boils.

Argentum Nit.—Eruption dark, bluish, or even black, accompanied by convulsions; convulsions preceded by extreme restlessness and tossing about; passage of quantities of greenish mucus, with copious emission of foul-smelling flatus.

Arsenicum.—In malignant cases, eruption delayed, or suddenly turns pale or livid, surrounded by petechie; drinks frequently, but little at a time; extremely restless and anxious; prostration, mild delirium; spasmodic action of tendons, with violent vomiting; eating or drinking brings on violent diarrhea; lips dark or black, cracked and often bleeding; grinds teeth during sleep; eating leaves a bitter taste in mouth; great desire for acids and cold drinks; vomiting of blood and mucus; hematuria; urine scalding, nd voided with difficulty; edema of eyelids; cold perspiration and extremities; tendency to dropsy; must constantly move and change position on account of oppression of breath; great emaciation; albuminuria.

Arum Triph.—Upper lip and nostrils excoriated by sanious discharge from nose; mouth, fauces, and posterior nares sore; nose and lips bleed from constant picking; ulcerous sore

throat; feeling of burning in larynx and fauces, with moist cough during day, but at night is compelled to sit up from spasmodic cough; nose obstructed, with or without a thick, yellow discharge which fills the throat and nasal cavity; ulcers in mouth, with burning pain and soreness; tongue raw, sore and papille elevated; saliva hot and burning; swelling of left submaxilliary glands; neck becomes stiff; itching of eruption which is spread over the whole body; urine copious and high-colored; high fever.

Asclepias Syr.—For dropsy of post-scarlatinal nephritis.

Aurum Met.—Nose when touched feels sore; discharge of offensive mucus from nose; extremely fetid otorrhea; caries, with passage of small fragments of bone from the ear; conditions analogous to mercurial or scrofulous disease, with tendency to destruction of tissue in the parts affected; bone affections; painful swelling of submaxillary glands; mind peevish and irritable; least thing excites anger.

Baptisia.—Mind wanders, and feels as if portions of body were here and there; face hot and dark-red; tongue at first dry and sore, with a white coating, and red, elevated papille, which later changes to a yellowish-brown in center, and dry, shining dark-red on edges; diphtheritic ulcers in throat; tonsils inflamed and swollen; foul-smelling breath; great dyspnea; urine scanty, dark-colored and burning; bloody stools with tenesmus; typhoid conditions; fever continues, accompanied by great weakness and loss of strength.

Baryta Carb.—During and after desquamation.—*Raue.* Submaxillary glands, tonsils and parotids swollen and painful; much saliva in mouth or is very dry; violent pains and spasmodic contractions in tonsils and fauces on swallowing.

Belladonna.—Delirium, accompanying congestion of brain; when asleep, starts up suddenly, dreams, is anxious, or tries to get up and walk; feels sleepy, but cannot sleep; on closing eyes, sees frightful objects; carotids throb violently; head hotter than body; head bent backwards; moves hand to head involuntarily; swallowing painful and difficult, especially fluids, which sometimes return through the nose; nausea and vomiting; often dreads water, but has violent thirst; glands of neck swollen; injection of the eyes; fiery red face, or sunken, or is pale and puffed; tongue coated white and edges red

"Belladonna is only indicated in the smooth form of eruption, with vascular and nervous excitement; it does no good in adynamic cases. The miliary form of eruption is much more adapted to amm. carb.; lachesis., or rhus. tox."—*Raue.*

Bryonia.—Face red and hot; lips dry and cracked; while asleep does not completely close eyes; tongue dry and thickly

coated brownish-white; large quantities of alkaline, frothy saliva; sudden disappearance or delay of eruption, causing dropsy, pleuritis or meningitis; motion aggravates all symptoms, while quiet ameliorates; obstinate constipation; slightest motion brings on nausea and vomiting; excessive thirst for large quantity of water, which is retained, while solids are immediately vomited.

Eruption does not appear after third day; face is pale and puffed up; throat greatly inflamed, aphthous condition of roof of mouth and tonsils; breathing anxious and oppressed with tendency to paralysis of lungs; glands of neck become hard and swollen; nose ulcerated and stopped up; no cough; breath very hot; "otorrhea a sequela."

Capsicum.—Throat burning and painful, worse between swallows; tongue dry and covered with burning vesicles; redness and burning of face, heat of face greater than body; throat and mouth burn and are of a deep-red color; tough, sticky mucus in mouth and throat, difficult to remove; variable humor; vomiting of phlegm; no thirst; excitability of all the senses.

Carbolic Acid.—Tongue, which at first is coated white, clears up and is glossy and red; foul odor of breath; fauces bright-red and swollen; breathing and swallowing are difficult from throat being swollen both inside and outside; face a dark-red color, while around mouth is a white circle: nose obstructed; dryness and chapping of lips; slight tympanites of abdomen; urine scanty and very dark; mucus exudation in patches on tonsils and pharynx; body covered with a scurfy eruption; frequent diarrheic, foul-smelling discharges.

Coffea Cruda.—Special senses very acute; intense mental and physical excitement causes sleeplessness; body hot to touch, but patient chilly; palpitation of the heart.

Colchicum.—Exceedingly irritable, with an expression of suffering on the face; tongue swollen and thickly coated white; mouth inflamed, with profuse saliva; smell of food irritates him, brings on vomiting; stools slimy, foul-smelling and exceedingly painful; urine dark, like ink, scanty and passed with difficulty and very painful, burning sensation; albuminurea; dropsy.

Conium Mac.—Delirium; loss of consciousness; headache worse in morning; burning, shooting pain in lips; difficulty of speech from paralysis of tongue; salivary glands swollen and hard; vomiting of dark-colored masses, like coffee grounds, very acrid; frequent urination, with burning during and after; black deposits on lips; skin very hot.

Cuprum Met.—Delirium with mutterings and fragmentary speech; sopor; constant uneasiness and tossing about; convulsions from sudden recession of eruption; contractions of flexor

muscles, and also of facial muscles, causing distortions of face. "Clings tightly to nurse, but is afraid of everybody else; fears of falling, or that fire will destroy the bed-clothes; wants to stay in nurse's lap; eruption does not appear, which causes terribly sore throat."—*Gardiner.*

Digitalis. — Especially useful in post-scarlatinal nephritis, with the following indications: great anxiety, feels as though he were dying; vertigo; throbbing pain in forehead; violent thirst, with extreme nausea and vomiting: stools colorless, nearly white; urine scanty, dark-colored, passed frequently, with burning and little at a time; edema of lungs; extremely slow, small, weak pulse.

Gelsemium.—Apathy, wants to be let alone, no desire to play or be amused; frequent, copious discharge of pale urine, which slightly relieves dull, aching pain in head; tongue coated thickly white; eruption slightly developed; face dull and heavy-looking; thickness of speech; intense nervous excitement or drowsiness and languor; tonsils swollen and injected. "Hands and feet cold; eyes suffused and heavy-looking; all the viscera are threatened when the eruption recedes; in all positions the whole face is a high crimson; delirious mutterings while asleep or half awake; sensation in throat as if it were filled up; languor and drowsiness with heat."—*Morgan.*

Helleborus.— Head feels dull and heavy, with stupor and unconsciousness; photophobia with dilated pupils; face colorless and edematous; vomiting of dark greenish masses; painful mucoid stools, like thick albumin; urine scanty, frequent micturition, deposits sediment like coffee grounds; post-scarlatinal dropsy. This drug is very useful when the mental condition, *viz.*, semi-consciousness approaching coma, is united with suppression of urine more or less marked.

Hyoscyamus.—Arouses from stupor to answer questions, but immediately relapses into former condition; muscles twitch and jerk here and there over the body; extreme sleeplessness and nervous excitability; illusions crowd upon the mind; eyes red and shining, with staring, stupid look; inability to swallow, with dryness and redness of mouth and throat; watery, painless diarrhea, passed involuntarily in bed; urine scanty and passed with difficulty or involuntarily.

Iodium.—Great emaciation; face pale or with a bluish-green cast; blue haze before the eyes; glands of neck and throat swollen and ulcerated: great appetite, but vomits as soon as he eats; all symptoms aggravated by warmth.

Ipecacuanha.—Vomiting of greenish mucus and bile; diarrhea of green mucus mixed with blood; intense itching after suppression of the eruption; moans and keeps eyes half

open during sleep; difficult, sighing respiration; cough and vomiting.

Kali-bichromicum. — Violent stitches in left ear extending from throat when swallowing; discharge of blood-streaked, tenacious, excoriating mucus from nose; throat dark, livid and covered with diphtheritic exudation; parotids swollen and painful; tongue ulcerated, smooth and red; ulcers on fauces; purulent infiltration of mucous membrane of nose and throat; furfuraceous eruption.

Kali carb. — Eyelids swollen, and hang down like sacs; mouth dry, covered with burning vesicles, and exhaling an odor like old cheese; parotids swollen and inflamed; burning, dry feeling of skin; very restless, with high fever.

Lachesis.—Delirium with constant mutterings and constantly changing moods; dull, heavy headache, with deep-seated pains in brain; discharge from nose watery, bloody, thick and dark; crusts form in nose; tongue swollen, and so heavy cannot protrude it beyond the lower teeth; difficult speech; tongue covered with blisters, black, stiff and cracked; throat so sensitive cannot bear the slightest weight on it, glands swollen and suppurating: cannot swallow fluids, they return through the nose; diphtheritic deposit first on left side, then gradually extends over the whole throat; offensive, sudden, watery stools; frequent urgings to pass foaming, dark, copious urine; eruption becomes bluish or black, with great dyspnea; effusion into the pleura and pericardium, also general dropsical condition; in malignant cases, with sloughing ulcers, or which become gangrenous and discharges are foul and acrid; in typhoid states. A marked characteristic indication for lachesis is aggravation of all the symptoms after sleep.

Lachnanthes.—Eyes brilliant and sparkling; much thirst, with burning in head like fire; redness of face in circumscribed spots; throat sore and dry with sticking pains on swallowing; when eruption about to appear, there is a sensation of heat and burning on the surface.

Lycopodium.—Dull, peevish, fretful; discharge from ear purulent; hair falls out; patches on right tonsil extending to left; face, hands and feet swollen and puffy; nose stuffed up, with acrid discharge from right nostril; submaxillary and glands of neck swollen, hard, and very sensitive; urine passed frequently in small quantities, and with burning; urine milky, scanty, deposits sand-like sediment; constipation and colicky pains during desquamation.

"Secondary eruption of dark-red blotches on thighs, back, and face."—*Raue.*

Mercurius.—Ears inflamed, sore and excoriated from dis-

charge which is bloody and offensive; grayish, dirty yellow coating on tongue; impression of teeth on edges of tongue; mouth sore and covered with vesicles; salivation; glands of neck and tonsils swollen and suppurating; itching all over the body aggravated by the warmth of the bed or perspiration; foul-smelling breath; exceedingly painful swelling of bones of nose.

Mercurius Iod. Flav.—Swelling and long-standing indurations of glands of neck, tonsils and parotids; tongue covered with a thick, dirty-yellow coating, edges red and clean; pain in left ear which is deep-seated and throbbing, and boring in character; infiltration of throat and neck; discharge of very greenish mucus from throat and nares; after *lachesis* for hoarseness; dark, scanty urine.

Muriatic Acid.—Mouth and throat very dry, ulcerated and foul odor; entire face red, body very hot and skin purple; upper lip and nostrils excoriated by acrid discharge from nose; fauces dark red, and covered with aphthae; coma at beginning of attack, with rapidly spreading, intense redness; rapid, small, very weak pulse; in typhoid conditions, patient sinks away down in bed; eruption is interspersed with petechiæ; patient so anxious and restless that he cannot keep the covers on; very deep, groaning, audible respirations.

Nitric Acid.—Mouth and throat very dry and burning, covered with deposits resembling diphtheria; tongue swollen, dry, and cracked, hindering speech and swallowing; offensive, thin, purulent discharge from nose and ears; skin covered with a fine miliary eruption and burning hot; parotids and submaxillary glands swollen, with deafness. "All secretions and excretions exceedingly fetid smelling; gums dark red, swollen, and easily bleeding, with foul odor from mouth; no swelling of fauces, but are darker in color; vomiting; exhausting epistaxis of dark-red blood."—*Kunkel.*

Opium.—Eyes wide open, stupid, easily frightened, sees frightful images; delirious and unconscious, with slow, stertorous breathing; paralysis of throat, with dryness and inability to swallow; symptoms of cerebral oppression with heavy breathing; retention of scanty, dark-brown urine; picks at bed-clothes; cannot stay in bed because it is too hot.

Phosphorus.—Unconsciousness, with low, muttering delirium; congestion of head; pupils contracted; fluent coryza; falling out of the hair; tongue dry, cracked, swollen, brown coating, and immovable; eyes and lids swollen; deafness, especially to the human voice; thirst, drinks large quantities of very cold liquids; alarming rattling in throat; suspicious chest symptoms accompanying disappearance of eruption; uneasiness and restlessness

from a sensation of burning; pulse exceedingly rapid, small and weak; urine scanty, dark-brown and deposits a red sandy sediment; diarrhea; ecchymoses.

Phosphoric Acid.—Pulse irregular, frequent, small, weak, sometimes palpitation; throat, mouth and tongue dry, without thirst; involuntary diarrhea, stools thin, watery, yellowish and painless; epistaxis of dark-red blood; quiet, indifferent, stupid, even to imbecility, aversion to speaking, cannot answer correctly, uses wrong words; rumbling and gurgling in, and distension of, abdomen; bed-sores of a bluish-red color; profuse sticky perspiration during night.

Phytolacca.—Throat and fauces dry, sore and congested; sensation of a lump in throat when swallowing, also violent pain extending to both ears; tonsils swollen, and covered with patches resembling diphtheria; pains in arms and legs like rheumatism; very restless and sleepless, while hands and feet are so hot, cannot keep them covered; skin is dry and harsh and feels like rough paper; eruption dry and shriveled; urine suppressed, with violent pains in head, back, and lower limbs.

Podophyllum. — "Distressing nausea; intense, long lasting vomiting of dark-green, watery mucus; useful to control vomiting when other remedies fail."—*Richardson.*

Rhus Tox.—Impatient, restless, low delirium, with stupor; putrid sore throat, first on left side, then on right; parotids and submaxillary glands swollen and discharging copiously ichorous pus; excoriating discharge from nose; nightly epistaxis; tongue dry, cracked, and red on edges; eruption dark red and livid, with intense itching over whole body; eruption of fine vesicles which burn and itch; mouth and throat very dry, causing intense thirst for cold drinks; penis and scrotum swollen.

Secale.—Raving delirium, with tendency to bite those near him; fears dying; deep, sighing respiration; dry, brown or blackish tongue, with constant unquenchable thirst; rapid loss of strength, with trembling of the whole body, and great restlessness; nose feels stopped up, yet there is a profuse watery discharge; cannot remain covered or bear the least warmth; involuntary, very offensive, slimy stools, with scanty discharges of bloody albuminous urine.

Silicia.—Drawing and stitching pains, with roaring in ears, when swallowing; ears so painful that patient puts her hands behind them; in scrofulous patients, glands swell and suppurate; suppuration of parotid, which is very much enlarged; otitis media and caries of mastoid processes; very sensitive to cold, takes cold easily, desires to be warm and well covered up; boils and abscesses come in series.

Stramonium.—Delirium, variable mood; eyes sore and pain-

ful, pupils dilated, photophobia so intense, that light causes convulsions; tongue yellowish-brown, swollen, stiff and dry; speech difficult or unintelligible from paralysis of tongue; mouth and throat very dry, with violent thirst, especially for acids; nausea and vomiting; restlessness, with violent tremblings over whole body; urine suppressed, and stools are passed involuntarily, and are of decomposing, foul-smelling blood; skin dry and hot, rash very fine, dark red and with intense itching.

Sulphur.—Nose feels sore, dry, stopped up, with fluent excoriating discharge; face swollen, dark red and burning, with distorted appearance of eyes; tongue coated white, red edges and covered with brownish mucus; eruption turns from a bright red to dark purple, followed by diarrhea, worse in the early mornings; white circle around mouth; mouth and throat very dry, swallowing difficult, great thirst; during stage of desquamation, and in scrofulous children.

"In cerebral affections that do not yield to bell."—*Snelling.*

Terebinthina.—Unconsciousness, with intense cerebral congestion; violent headaches, relieved by passing large quantities of smoky urine; tongue smooth, bright red and shiny; great thirst, but drinking brings on nausea and vomiting; vomiting and diarrhea of yellow mucus and water; urine scanty, profuse, bloody, albuminous, and intensely hot; eruption appears very slowly, with burning and tearing pains in kidneys; pulse small, thready, and almost uncountable; edema of upper portion of body.

"Albuminuria and dropsy after scarlet fever; urine greenish and loaded with albumin; much thirst, drinking often, but little at a time."—*J. B. Bell.*

Veratrum Viride.—Delirium, with mutterings, dilated pupils, incessant headache, nausea and vomiting, and sleeplessness; urine dark, cloudy and bad odor; tremblings, twitchings and contortions of muscles; great prostration; red streak through the middle of yellow coating on tongue; great arterial excitement, active congestions and intense fever; eruption preceded by convulsions, slow, difficult respirations and small, quick, irregular pulse; rheumatism and edema.

Zincum.—Respirations short and quick, panting; stupor, preceded by convulsions; tendency to brain paralysis; back of head and neck very hot and covered with perspiration; twitchings and jerking of single muscles or even the whole body; forehead and face cold, pale, distorted and covered with cold perspiration; child is unconscious, perfectly motionless; body and extremities cold, pulse small, quick and thready, skin purplish; stools and urine passed involuntarily; urine scant, bloody and hot; grates the teeth, and every now and then emits fright-

ful screams; eruption recedes; mouth and throat very dry, with large quantities of mucus in pharynx.

For suppression of urine, with or without dropsy, there is a new remedy of great value, known as *Diuretin*, which has within the last two years served us when other and better-known drugs had utterly failed. It is obtained in the form of a white powder, is practically tasteless and does not affect the stomach or bowels, even when given in large doses. It may be given dissolved in water, milk or any other desirable medium. It should be given to a child of two or three years of age, in doses of two to three grains, repeated every three hours, until its specific action on the kidneys is secured.

In some cases, its effect is not perceptible until seventy-five or one hundred grains have been taken. In one case of post-scarlatinal dropsy, to which we were called in consultation, by Dr. S. P. Hedges—the child, who was some five years of age, took upwards of two hundred grains in the course of three days, before its full action was manifested, after which the kidneys performed their function without further trouble.

This drug will rarely be needed, if other well-verified remedies are sufficiently studied to be properly affiliated.

HYGIENIC MANAGEMENT.

Much of what might come under this head, has already been said when speaking of prophylaxis.

The sick room should be a quiet one, and as far as possible removed from the ordinary living rooms of the family. This is essential, not only to prevent the spread of the contagion, but also for the comfort of the patient. It should be an ample apartment, well ventilated, and kept at a temperature of from 65° to 70° Fahr. The strictest cleanliness should be maintained throughout the course of the disease.

All handkerchiefs and discarded linen should be burned or disinfected before being used again.

The evacuations from bowels and bladder should be received into vessels charged with inodorous disinfectants, and as soon as voided should be immediately disposed of. The diet should be mainly liquids, and consist largely of milk, koumiss and animal or vegetable broths. Distilled water may be given freely. Ice may be held in the mouth until dissolved, and will be very grateful in the height of the fever. Where prostration threatens, it may be combated with dilute whisky or brandy. In cases where the stomach is intolerant of food, the strength may be supported and time gained by the use of nutritive enemata. For this purpose we have had great satisfaction in the

use of "Murdock's Liquid Food," diluted one-half with warm water.

When diphtheria complicates the case, the remedies and measures should be employed which are fully described when speaking of this disease.

The use of peroxide of hydrogen is so essential in such cases, that we make reiterated mention of it here. In cases where the eruption is dilatory in appearing, and the skin dry and hot, the wet sheet pack may be resorted to without hesitation.

In the early part of the disease, when the temperature runs up to or exceeds 104° Fahr., the body should be sponged off frequently with cool or tepid water.

During the eruptive stage the itching of the skin is sometimes very annoying. This can be greatly alleviated by rubbing the surface over frequently with olive oil, or the unguentum grecorum, previously spoken of. When the kidneys are involved, hot poultices of linseed meal should be placed over the loins, and changed as often as they get cold.

In anasarca, the hot wet-sheet pack, by opening the pores and producing a derivative action, will be found exceedingly serviceable. Several packs may be given in the course of twenty-four hours, if necessary, and the patient may remain in the pack for one or two hours at a time.

During convalesence, great care must be taken to avoid exposure to cold; the clothing should be warm, and when desquamation is fully over, the patient should be well bathed, newly clad, and only allowed to exercise moderately until health and strength are fully restored.

CHAPTER V.

ROSEOLA.

Definition.—The term roseola, or rose rash, is used so differently by different authors, that it is somewhat puzzling to one who seeks for a plain and distinctive definition of the word. It is so trifling an affection that some authorities ignore it entirely, while others only refer to it when differentiating other diseases attended by an efflorescence. It so closely simulates certain other eruptive fevers, however, notably scarlatina, that it should always be borne in mind when the diagnosis of this latter disease is in doubt. It is essentially an erythema of reflex origin, and usually is due to some trifling derangement of the stomach.

Some children are very subject to it. It is non-contagious, and its duration is seldom longer than twenty-four or forty-eight hours. More often it lasts but a few hours. It is especially common in spring and autumn, and this partiality to certain seasons of the year has given rise to the names, "roseola estiva" and "roseola autumnalis." One attack does not prevent its recurrence; indeed, a child who has once had it is very liable under similar provocation, to have it again. It seems to be more prevalent in some families than in others. I have one family on my regular list in which there are now six children. Three of these children have had one or more attacks of roseola, the first one being attended by so much fever and redness of the fauces that I was quite sure it would prove to be a case of scarlet fever. I gave, however, a qualified diagnosis, and the next day the preparations which were begun to isolate and care for scarlatina, were abandoned, as my patient was as well as ever. In this case there was not only the deep scarlet rash pervading the entire body, and a sore throat, but also vomiting and a temperature, at the time of my visit, of 104° Fahr. Such a case as this is very confusing, and emphasizes the fact that in all of these eruptive diseases the physician should act guardedly and give himself time for a correction of his diagnosis, should this be necessary. Roseola is usually caused by some derangement of the digestive apparatus, but it occasionally complicates other diseases. Dr. Eustace Smith says that it may come on in the "pre-eruptive stage of small-pox, and is apt to occur in vaccinated children, and in rheumatic subjects."

Symptoms.—Signs of stomach disturbance, more or less pronounced, usually precede or accompany roseola. Sometimes vomiting or diarrhea is present, but this is not uniformly so. It frequently happens that a child in previous good health is suddenly attacked with symptoms of indigestion, such as nausea or vomiting, anorexia, headache and a furred tongue, and soon thereafter a fever of more or less intensity, accompanied with an efflorescence on the external surface, makes its appearance. The eruption is very irregular in its manifestation, sometimes covering only a meager portion, and again extending over the entire body. The eruption is quite similar to erysipelas, but lacks its puffy character. It is without elevation of the surface, and is evenly diffused over the affected part.

In these respects it strongly resembles scarlet fever. If a cold is at the foundation of the gastric disturbance, a sore throat may complicate the symptoms and make the differential diagnosis between roseola and scarlet fever, a problem of extreme delicacy. Some years ago I was called in counsel by my associate, Dr. Schneider, to see a case which well illustrates the difficulties which sometimes present themselves in such cases. Mrs. F. had issued cards for a garden party, to which a large number of children were included; Two days before the fête, her youngest child—a little girl four years old—was taken ill with high fever, sore throat and a generally diffused scarlet efflorescence. The child had vomited twice before my arrival, at ten o'clock P. M. The question of diagnosis was a vital one. If it was scarlet fever, the invitations to the garden party must be recalled in the morning; but if it was only a transient illness, without danger of contagion, there was no necessity therefor. I gave the case a very thorough examination. The temperature was 104° Fahr.; there was a distinct angina, with a slight, but perceptible exudation on the right tonsil; the body was fairly ablaze with a scarlatinous or erysipelatous blush. I was on the point of pronouncing the case clearly an attack of scarlatina, when the mother said, "I am sure this is only an indigestion, for she has had two attacks just like this before and was as well as ever the next day."

In view of this statement, which was confirmed by Dr. Schneider, I advised waiting until morning, before deciding on the diagnosis and recalling the invitations. To my surprise, and greatly to the gratification of all concerned, I found, on my visit next morning, a complete change in the whole picture. The temperature was normal, the throat symptoms were nearly gone; the rash had almost disappeared, and the child was pleading to be dressed and to go out to play.

Better counsel, however, prevailed; the child was confined to

bed that day, the diet was restricted and the party was allowed to proceed without any bad results following.

My friend, Dr. W. A. Edmonds, in his work on "Diseases of Children," takes a very different view of this disease and insists on its possessing a decidedly contagious character. He says: "My clinical experience has decidedly inclined me to consider it contagious, as I have rarely seen a case in a family of several children, which was not followed by others, just as we see in rubeola and scarlet fever." He further says: "I do not think I have ever seen but one individual have the second attack, and that, an individual of peculiar susceptibility to contagion, as he has had scarlatina, rubeola, yellow fever, and roseola, each a second time."

It is difficult to account for such a variance of opinion based upon clinical experience, but differ as we may upon other points, all observers are agreed that the disease is uniformly mild; that it is of short duration, and devoid of complications and sequelæ. The disappearance of the eruption is not followed by desquamation.

Diagnosis.—The appearance of the rash is so nearly like that of scarlet fever, and, as we have seen, there is liability of the occurrence of an incidental angina, so that the diagnosis will often be in doubt for a few hours after the onset of an attack; but a short time will suffice to clear up all doubts. The fever of roseola rarely lasts over twenty-four hours, while that of scarlet fever does not abate or even ameliorate until the subsidence of the eruption, which ordinarily does not occur until after the lapse of several days. In roseola there is wanting the characteristic tongue, the mental symptoms and the evidences of nervous shock which usually characterize the graver disease.

Prognosis.—This is always favorable.

Treatment.—Remedial measures are scarcely called for in a disease so benign and so devoid of danger as this, but the clinical fact, which is universally recognized, that the affection is dependent on gastric derangement, would suggest the employment of such drugs as would restore the normal tone and function of the digestive apparatus. In the beginning of the attack, the fever may be aborted by aconite and belladonna.

After one or both of these have been given for a few hours, such remedies as arsenicum, nux vomica or laurocerasus may be given. The bowels should be opened by warm-water enemata if necessary, and for a day or two the diet should be restricted.

In many cases of mild type no medication at all will be necessary.

DIFFERENTIAL DIAGNOSIS OF ERUPTIVE FEVERS OF CHILDHOOD.

	Measles.	Rötheln.	Scarlatina.	Roseola.
Incubation.	7–12 days.	7–14 days.	Few hours to seven days.	None perceptible.
Prodroma.	3–5 days.	None.	None.	None.
Initial Symptoms.	Acute coryza.	Fever and rash.	Vomiting, fever and rash.	Fever and indigestion.
Duration.	9–14 days.	3–7 days.	7–42 days.	A few hours to several days.
Complications.	Bronchitis, pneumonia.	Scarcely anything.	Acute albuminuria or Bright's disease.	Gastric irritation, constipation or diarrhea.
Sequele.	Eye and ear troubles.	None.	Almost everything.	None.
Special Symptoms.	Coarse rash, loose cough, tongue moist and white.	Coarse rash, no cough, tongue slightly coated or not at all.	Fine rash, no cough, tongue heavily coated 48 hours, then reddish raised papille.	Fever, vomiting.
Brain.	Unaffected.	Unaffected.	Delirium.	
Temperature.	100°–102° or 103°	Rarely over 100°	102°–107°	100°–103°
Skin.	Sometimes slight desquamation.	No desquamation.	Nearly always general desquamation.	Dry and hot.
Contagious.	Highly so.	Moderately so	Highly so.	Never.
Eruption.	Dull red, crescentic.	Pale, red, irregular.	Bright red, diffusely.	Fine rose-colored and generally local.
Eruption appears first.	Forehead and face.	Face.	Face, neck and chest.	Uncertain.
Eruption—extension over body.	3 days.	2 days.	2 days.	

DIFFERENTIAL DIAGNOSIS OF ERUPTIVE FEVERS OF CHILDHOOD.—*Continued.*

	Measles.	Rötheln.	Scarlatina.	Roseola.
Throat and palate.	Slight sore throat, dark spots on palate.	Rarely affected.	Always more or less sore.	Uncertain.
Glands.	Rarely involved.	Never seriously affected.	Generally enlarged and painful.	Unaffected usually.
Prognosis.	Generally favorable.	Always favorable.	Always guarded.	Always good.

CHAPTER VI.

VARICELLA (CHICKEN-POX).

VARICELLA, or as it is more often called, chicken-pox, is the mildest of all the eruptive fevers. It is, however, highly contagious, so that few children escape who are exposed to it. It is confined almost wholly to early childhood, and attacks the same individual but once. It is quite inclined to be epidemic in its nature. West seems inclined to derive the word *chicken* in this connection from the mildness of the disease. It has been thought by some to prevail principally before, during or after epidemics of small-pox, and hence it was conjectured to be a modified form of variola; hence its name varicella, signifying little variola. This idea is not entertained at the present day, because clinical experience is opposed to it. It has been found that varicella may occur after variola, and variola after varicella. So that the one is no protection against the other. Besides, the two diseases are very dissimilar as to duration, gravity, and the time of life at which they are most prevalent.

Varicella is peculiar to infancy and childhood. Dr. J. Lewis Smith and Prof. Austin Flint have each observed one case of the disease in an adult, but such an occurrence is very rare.

Moreover, M. Delpech and others have seen varicella and variola occur simultaneously in the same individual. The disease varies somewhat in the amount of eruption and the intensity of the attendant symptoms, but it is always mild, and is free from complications and sequelæ.

The disease derives its chief interest and importance from its liability to be confounded with variola, a mistake which has been made, in spite of the great dissimilarity in symptoms and course.

Symptoms.—The constitutional disturbances which mark the stage of invasion in varicella are exceedingly variable. In typical cases the disease is ushered in by a mild fever, the temperature rarely going above 101° Fahr., and the pulse rarely exceeding 108 or 112 per minute.

It is not unusual for the patient to complain of headache, languor, chilliness, and sometimes aching in the back or limbs. In some cases the fever is entirely absent, or so slight as to escape notice. The appetite is rarely lost, and there is no inter-

ruption to the child's amusements. When fever is present it usually lasts for twenty-four or thirty-six hours, when the characteristic eruption makes its appearance. This consists of small, scattered papules, which in a few hours become vesicular. This rapid vesiculization of the papules is a marked and distinctive feature of the disease. The papules are not hard and situated on an inflamed base, like those of variola, although they are sometimes surrounded by a faint zone of redness. The vesicles do not, except very rarely, become umbilicated, and are of various sizes and shapes; some being small, round and acuminate, while others are large, oval or elongated. The size varies from half a line in diameter to two or even three lines. A peculiarity of these vesicles is that they appear in successive crops, and finally disappear by dessication.

Sometimes permanent cicatrices are left, but this is generally due to the premature rupture of the vesicles by scratching. The pruritis is frequently almost intolerable. The eruption of varicella is generally in the upper portion of the body, either on the back or chest. From whatever part the eruption begins, it rapidly extends over the body, the face, scalp and extremities. The distribution of the rash is variable. In exceptional cases there may not be more than a dozen or twenty vesicles all told, while in others the number may mount up into the hundreds, covering the whole cutaneous surface. The eruption, as a rule, is most abundant and characteristic on the forehead and temples. The vesicles do not tend to become confluent. As they mature, many become cloudy, and the contents slightly tinged with yellow, from the presence of a few pus cells; but according to Fox, they never become purulent.

On the second or third day, the eruption begins to decline, the vesicles dessicate, some grow tense and burst, or are ruptured by the scratching of the patient, when they form their yellowish or brownish crusts. These disappear in a few days, leaving small circular patches of reddened skin.

The eruption affects the mucous membrane as well as the skin. The vesicles are thickest on the hard and soft palates. They often form on the prepuce in boys and in the vagina in girls, in which case they give rise to much suffering and cause trouble in urinating.

Diagnosis.—The differential diagnosis between varicella and variola, is usually quite clear, if the following facts are borne in mind:

The age of the patient. Variola attacks persons regardless of age, while varicella is peculiar to infancy and early childhood. The period of invasion is different—that of varicella is shorter, wanting altogether, the rash being the first indication

of the presence of the disease. In variola the period of invasion is three days in duration, and the symptoms of this period are well defined. There is a chill, a high fever, vomiting, with intense headache and backache.

These symptoms are never present in varicella. In variola the papules do not become vesicular until the sixth or seventh day. In varicella, the macules become vesicular in from twenty-four to forty-eight hours, and then quickly dry up into a light, easily detached crust. In variola, the eruption is most abundant on the face, hands and feet, while in varicella, the eruption is most profuse on the back. The face, hands and feet show but few vesicles.

The mild and almost insignificant character of the febrile stage of varicella is very different from the intense fever which attends variola, and in the latter there is a secondary fever marking the pustular stage, which is altogether wanting in the former.

In typical cases of the two diseases, there is but little danger of confounding them; but when irregularities occur, as sometimes happens, the physician will have occasion to exercise the greatest care, to avoid falling into error. It will not do to decide the question on any one symptom, but the entire category must be weighed separately and together, in order to reach the truth.

The following extract from the writings of Dr. John D. Fisher, of Boston, gives an admirable comparative description of the two diseases.

"In most cases the chicken-pox is, by the experienced observer, easily and readily distinguished from the small-pox. When, however, the former is extraordinarily violent, and the latter unusually mild, the distinguishing marks are obscure, and the two diseases are therefore frequently confounded. To render the distinctions as clear as possible, the more prominent symptoms of the two diseases are here contrasted with each other.

"In small-pox the fever is ushered in by a cold stage, is severe and continues three or four days, and if it declines or ceases during the eruptive process, it commonly reappears during the suppurative stage, or between the fifth and eighth day of the eruption.

"In chicken-pox the fever is not often preceded by a cold stage, is uniformly light and is frequently insensible; it seldom continues more than two days and never reappears after it has once ceased. When, however, the vesicles appear in successive crops, the fever lasts longer and rages until the eruption is completed.

"In small-pox the eruption is often preceded or accompanied by an erysipelatous efflorescence.

"In chicken-pox this efflorescence does not take place.

"In small-pox the eruption does not break out until the third or fourth day of the fever; it appears first on the face, then on the neck, chest, trunk and extremities, and is completed in the course of two days.

"In chicken-pox the eruption breaks out by the termination of the first or on the second, and almost invariably before the end of the third day of the fever; it usually appears first about the breast and shoulders, afterwards on the face and extremities. It often, however, follows a different order, and is never so uniform in the method of its invasion as the eruption of small-pox; it frequently appears in successive crops for four or five days.

"In small-pox the eruption presents itself in the form of small red circular points or papulæ; these are hard, resisting and movable, and communicate to the finger a shot-like sensation. They scarcely project above the surface, but are easily and distinctly felt by drawing the finger over them.

"In chicken-pox the eruption likewise breaks out in small inflamed spots, but these are not papular in their origin, and are not exactly circular, but tend to an oblong figure. They may be distinctly felt by the finger, but they are yielding under it and are destitute of the tubercular hardness and rolling motion which characterize the variolous eruption at the same period.

"In small-pox the eruption seldom becomes vesicular before the end of the second or the commencement of the third day, and the vesicles are confined to the summits of the pocks.

"In chicken-pox the eruption is vesicular from the beginning, or from the early part of the first day, and by the second day the whole surface of the pocks are converted into vesicles which resemble little bladders of transparent fluid.

"In small-pox the pustules at first have acuminated summits; they afterwards become rounded, and at an early period present slight depressions in the center of their surfaces.

"In chicken-pox the vesicles are usually lenticular in form, but are sometimes conoidal or globate, and preserve one shape through their course, or until they become ruptured.

"In small-pox the eruption is situated in the substance of the cutis, as has been proved by dissection, and as is evident from the sensation which the pustules communicate to the finger.

"In chicken-pox the vesicles are not formed in the true skin,

but are situated upon its surface in the cellular tissue between the skin and cutis.

"In small-pox the pustules after they have become vesicular are distinguished by hard, unyielding bases.

"In chicken-pox the vesicles are destitute of such tubercular basis. They are yielding and easily give way under pressure, and communicate to the finger a soft, elastic sensation, or a feeling similar to that which a minute globule of fine sponge softened with water would give rise to when pressed.

"In small-pox the pustules are composed of little cells, all of which, however, communicate with each other; and the cuticular covering of the pocks is opaque, tough and not easily broken.

"In chicken-pox the vesicles are composed of a single cavity, and the coverings are extremely thin and fragile, are diaphanous and are very easily broken.

"In small-pox the pustules are, at an early stage, filled with a serous secretion; this, after a time, becomes converted into a purulent matter that exhales a very unpleasant and peculiar odor.

"In chicken-pox the vesicles contain, when fully matured, only a whitish, transparent and serous fluid; this never, except through accident, becomes pus, and is destitute of any ungrateful odor.

"In small-pox the pustules remain whole till they are six or seven days old, when some of them commonly become ruptured, and permit a little of the virus to ooze out upon their surface; but they still retain their form and prominency.

"In chicken-pox the vesicles often become broken in two or three days after their appearance, and permit the whole of their contents to escape. Their coverings then sink down and collapse, and the vesicles become flattened and lose their original form.

"In small-pox the pustules break out simultaneously, pursue a regular march and arrive at maturity at about the same time.

"In chicken-pox the vesicles generally break out in successive crops for a number of days, in which case a great variety may be observed among them; some are appearing, whilst others are fully formed, shriveled or crusted.

"In small-pox desiccation does not commence till about the eighth day from the appearance of the eruption.

"In chicken-pox, when the vesicles run their course without bursting, desiccation commences in them as early as the fifth day of their age, but it always begins as soon as the vesicles are ruptured, and consequently it more usually commences on

the third or fourth day, and sometimes as early as the second day after they appear.

"In small-pox the processes of eruption, of suppuration and of desiccation constitute three successive periods, rendered distinct from each other by their duration; the first occupies about three days and the other two about five days each.

"In chicken-pox these three periods seem to be confounded in consequence of the pocks appearing in successive crops, and even when they are distinguishable, the sum of their duration seldom exceeds eight days.

"In small-pox the scabs fall off in a single piece.

"In chicken-pox the scabs do not usually fall off in a single piece, but in small fragments of different forms and sizes.

"The small-pox, even when distinct and of moderate mildness, is a disease of fifteen or twenty days in duration, and it often proves fatal.

"The chicken-pox, on the contrary, runs its course and is completed in five or six days, or in eight or ten at most, and it never, of itself, proves fatal.

"The distinctions between the chicken-pox and the varioloid disease, or the small-pox in its modified form, are less striking, and less easily recognized. The following peculiarities, however, may generally be observed in the two diseases, and will, in most cases, lead to a correct discrimination.

"The chicken-pox, as has already been stated, is distinguished by the eruptive fever being generally light.

"In the varioloid disease the precursory fever is commonly sharp and of several days' duration.

"In chicken-pox the eruption appears in the form of vesicles, or it is vesicular, at least, from an early period of the first day.

"In the varioloid disease the eruption is always papular in its origin, and seldom becomes vesicular before the second or third day. It appears all at once and seldom breaks out in successive crops. The pocks are, in the first instance, elevated on solid tubercular bases, and their tops are resisting and not easily broken. The eruption, as in the unmodified variola, is formed in the substance of the true skin, as is evident from the hard and elevated bases which remain after the lymph is removed from the pustules by puncture and pressure, and by the kernels or tubercular elevations which remain in the skin after the scabs have fallen off. The pocks from their first formation are hard and unyielding, and are movable and rolling under the finger."

To these distinguishing characteristics, all of which have been noticed by various writers, the author would add the following:

"In chicken-pox, if, during the first day of the eruption, the parts on which it exists be embraced with the thumb and finger and gently distended by them; or if a single finger be drawn over them with a force just sufficient to cause the little ruge of the cuticle to become smooth, the inflamed spots, in which form the vesicles first present themselves, readily disappear and leave no discoloration or induration in the skin.

"In the varioloid disease, if a like distention of the parts occupied by the eruption be made at the same date, the inflamed spots disappear less readily and, even when the distending force is sufficiently great to make them disappear, a dim discoloration can be perceived and a distinct shot-like hardness may be felt at the points upon which they were planted.

"In chicken-pox the scars left in the skin after desquamation are destitute of any peculiar hardness, and are, in the space of a few days, entirely erased.

"In the varioloid disease the eruption, for a considerable time after the scabs have fallen, leaves little kernels, or tubercular elevations, in the skin. The varioloid disease has the power of communicating the unmodified and modified small-pox."

In addition to a careful study of these distinguishing features, the physician should ascertain if the patient has been sucessfully vaccinated within five years; if so, the probability is in favor of varicella, particularly if the subject is a child, as varicella rarely affects an adult.

Treatment.—The treatment of varicella does not call for any extended comment. Ordinary cases will not require any treatment. There is no known prophylactic. The disease will run its usual and discreet course, whatever is done or left undone.

VACCINIA—VACCINATION.

Vaccinia is a mild eruptive fever produced by vaccination for the purpose of protecting the subject from the graver disease, small-pox. It is communicable only by contact, and is not contagious through the air like the other eruptive fevers.

It is inoculable by the lymph contained in the vesicle, and also by the moistened scab which results from the dessication of the pustule.

Vaccination has now everywhere taken the place of inoculation, which was the first step which scientific medicine took to stamp out that most dreaded of all diseases, small-pox. For fifty years —the latter half of the eighteenth century—inoculation was practiced both in Europe and in this country, but so many deaths and so much indirect suffering occurred as the result of

this method, that it began to be looked upon with distrust. The efficacy of the operation in mitigating the severity and danger from small-pox was certainly very great, for the proportion of deaths following it was, on an average, only about three in a thousand—a very gratifying contrast to the mortality of the disease communicated in the usual way. "But there was one fatal drawback. However light the engrafted disease might be, it was still small-pox; and the more it was conveyed in this way, the more were centers of infection multiplied, from which those not protected were liable to contract the disease in its worst form. To individuals, inoculation was a great blessing; to society at large, it was a great curse. In the early part of the eighteenth century, before inoculation, about one-fourteenth of the deaths in Great Britain were from small-pox; in the latter part, after inoculation had become quite general, about one-tenth of the deaths were from that disorder." * It was at this time (1796), when inoculation as a preventive of small-pox, had received general recognition, but not general adoption, for reasons already stated, that Jenner demonstrated the great and immortal fact, that by passing the small-pox virus through one of the lower animals, especially the cow, it could be so modified as to lose its contagious properties and yet, when inoculated, thus modified, into the human system, it afforded all the protection which resulted from the use of the genuine virus.

Vaccination, then, is the conveyance of small-pox into the system of a susceptible human being, but of a small-pox wonderfully modified, and shorn of its terrors, by previously passing it through an animal.

In the process of transmission through a lower animal organism, it has in some way, parted with its contagious property, so that vaccinated small-pox, thus modified, is not constantly spreading the disease as was the case with inoculated small-pox. Jenner demonstrated that the horse as well as the cow could be made the subject of variolous infection, a fact that has been repeatedly verified since his day. At present, however, the cow is practically the only source of original supply of vaccine virus; indeed, the term vaccination is derived from "*vacca*," "a cow."

No other discovery in the whole history of medicine compares with that of Jenner, in relieving human suffering and saving human life; and if vaccination were only universally employed, there is every reason to believe that small-pox would be wiped from the face of the earth. In Chicago there is a

* Dr. W. T. Plant, in "Cyclopedia of Diseases of Children."

constant inspection of all the pupils attending the public schools, and no child is permitted to attend school without a certificate, showing recent vaccination. During the year ending December 31, 1892, small-pox made its appearance five times, but in every instance the source of contagion was traced to foreign countries, and in a population of 1,250,000 people, there were, during this year, but two deaths from small-pox. The opponents of vaccination need no other answer than to contrast this almost complete exemption with the annual mortality from this disease in all countries one hundred years ago.

The Virus.—Until a comparatively recent period, the source of supply of fresh animal virus was so uncertain and precarious that the custom prevailed of using lymph from the human subject, and thus transmitting the vaccine disease from one person to another.

But the danger of inoculating healthy persons with constitutional taints, such as struma, psora, and syphilis, came to be regarded as so great that of late years this source of supply has been nearly abandoned. Besides, it is believed that the virus thus procured, after many transmissions, becomes so attenuated as to be of uncertain efficacy. For these reasons it is now the general custom to use only bovine virus, procured directly from the cow. In order to keep up a uniform and reliable supply of this virus, there have been established numerous "vaccine farms," in different parts of the country, where young heifers are constantly subjected to the process of propagation. From these "farms," or vaccine establishments, the lymph is distributed by mail or express as needed, to all parts of the world.

The virus is dispensed either in the form of scabs, or on ivory points that have been dipped in the fresh lymph of a punctured vesicle. The latter is decidedly the more preferable, as the ivory point makes an admirable vaccinator.

It should be borne in mind that vaccine virus, whatever be its source, is very perishable, and soon loses its efficacy if exposed to light, air, warmth, or moisture. Cold does not affect it, and with proper precautions it may be kept indefinitely.

Vaccination.—Vaccination is the slight surgical operation necessary to insert the virus, and consists in getting an abraded or denuded surface of small area, on which the moist virus is placed and allowed to dry.

The exact site where the vaccination is to be performed is optional, but generally the arm or leg is selected. If the former, the outer aspect of the left arm is preferred, at or near the insertion of the deltoid muscle. With females we prefer to use the leg—it matters not which—for the reason that in a certain

proportion of vaccinations, no matter how fresh and pure the virus nor what amount of care is exercised in the operation, an excessive amount of inflammation and suppuration will ensue and in consequence a scar will result which on the arm will ever after be an unsightly blemish. Even with boys we prefer the leg, on account of the greater facility with which it can be inspected and if necessary, treated.

When the leg is chosen for the operation, the virus should be inserted at about the outer edge of the gastrocnemius muscle, midway of its length.

The ordinary instrument used for vaccination — when a special instrument is used at all—is the common lancet. This should be perfectly clean, and care should be taken not to draw blood, if possible.

The epidermis may be scraped until the cutis is exposed and a little serum exudes. This scraping should be over a surface from a quarter to half an inch square. On this abraded surface the virus, moistened just enough to "revive," is placed and allowed to dry. It is never best to cover the wound with plaster or bandage immediately after the operation, for the reason that either is liable to absorb the lymph before the skin is able to do so.

A better method than that just described is to scarify the necessary surface with the ivory point, which is made sharp at the charged end expressly for this purpose. A dozen or twenty linear incisions should be made, all quite superficial, and from half a line to a line apart; then as many cross incisions should be made in like manner, after the manner of a checker board. If some blood is drawn, as is most always the case, it should be wiped up with a clean cloth or a blotter. The ivory point, slightly moistened in cold water, should then be rubbed over the surface and the moisture allowed to dry as before.

PAINLESS VACCINATION.—Whichever of the foregoing methods is chosen, there is some pain, or at least some discomfort with it. Some children are much more susceptible to pain than others. Few parents like to see their infants hurt, and to the onlooker the operation of scraping or scarifying the delicate skin of a young infant seems a barbarous procedure.

All of this can be avoided if the physician will but take the trouble, and the vaccination can be successfully done while the child is peacefully slumbering. The author does not know to whom he is indebted for this painless method, but he has employed it for many years past and in scores, if not in hundreds, of cases. It is believed to be a superior method, not alone

because it saves suffering, but because it is more uniformly successful in results than any other.

The plan is to apply to the arm or leg of the child, a few hours before the operation—say the night previous—a piece of adhesive plaster an inch square, in the center of which has been placed a mere dot of Spanish-fly blister. The fly ointment should be used, as the powder deteriorates very rapidly, and care should be taken that the ointment is fresh or disappointment will ensue. After the lapse of a few hours, the piece of plaster is to be carefully removed, and a small blister will be found on the site of the cantharides. This should be punctured and the serum let out, and on this denuded surface of the cutis vera the virus is placed, just as in the other methods. Care must be taken not to make too large a blister. The amount of cantharides should be the smallest possible—the merest dot—less in size than the head of an ordinary pin.

Symptoms and Course.—For a period varying from three days to a week there are no visible or perceptible phenomena. The virus is in process of incubation. On the third or fourth day a small, hard papule makes its appearance at the point of operation. In the course of twenty-four or forty-eight hours this papule becomes a vesicle, and in another day it has become umbilicated and divided into eight or ten cells or compartments—in this respect acting precisely like the genuine small-pox vesicle. By the eighth or ninth day after the operation the vesicle has matured and attained its complete development. It is raised prominently above the surface and is distended with transparent fluid. This fluid is the lymph used for subsequent vaccinations where human virus is employed.

When desired for this purpose, the vesicle should be punctured—never later than the ninth day—and carefully preserved in a cool place, unless used immediately. At this time, a belt of inflammatory redness forms about the base of the vesicle, or pustule, as it has now become. This is the characteristic *areola*, which indicates successful vaccination. For several days the areola widens until it attains a diameter of two or three inches. There is now considerable induration; the flesh is hard, hot, itchy and painful. As these phenomena develop, there are constitutional symptoms evolved, such as fever, headache, rigors and general aching. The member operated on is apt to be lame and painful. Not infrequently the axillary or inguinal glands become swollen and tender. This state of affairs is of short duration. After the tenth day all inflammatory symptoms decline, and the constitutional disturbance abates. The local pain, the itching and the swelling rapidly decrease; the areola fades away; the fluid in the vesicle loses its translucence and

speedily dries down into a hard, dark crust, which falls off about the twenty-first day, leaving a circular, depressed scar, at first red, but soon pale, which commonly lasts through life.

Deviations and Complications. — While vaccination ordinarily runs a regular course, one phenomenon following another in systematic order, this is not always so, and deviations from the rule are sometimes met with, for which the physician is unjustly blamed. The cases where vaccinia produces more than temporary illness, as above described, are rare, and when eczema or erysipelas supervenes, or extensive suppuration occurs, it is generally attributable to a constitutional defect in the child, rather than to the impurity of the vaccine virus, or an illy performed vaccination. It is quite possible for diseases and tendencies, that have been hitherto latent, to be stirred into activity by this operation, but surely, in such cases, the unexpected results should not be charged to the operation itself, which, as a rule, is so free from danger and so benign in its effects.

The question is often asked, as to the degree and duration of the protection against small-pox, which is afforded by vaccination. There have been exceptional cases recorded, in which vaccinated persons have contracted variola, notwithstanding they could show a characteristic scar. In such cases the immunity is only partial, and a modified small-pox is possible. Dr. Buchanan, of London, has carefully compiled statistics of deaths from variola among the vaccinated and the unvaccinated, from which it appears that the death rate from small-pox, among those who were vaccinated in infancy, is 40 per million, while the death rate from this cause among the unvaccinated is 5,950.

Among those vaccinated in infancy or early childhood, there is undoubtedly a tendency to outgrow the protective virtues of the operation. There is a general impression that such vaccinations should be repeated after puberty is passed. Dr. Martin is quoted as saying that he has succeeded in re-vaccinating with bovine virus in seventy-three per cent. of the cases in which he has tried it. In case of exposure, re-vaccination should be performed, unless a prior vaccination has been successful within five or six years, whether in child or adult.

It occasionally happens that a child is vaccinated one or more times without typical results. In such cases the fault is presumably the fault of the virus or the operator rather than the subject. It is believed that susceptibility to vaccinia is universal and without exception. Dr. Plant is authority for the statement that of upwards of nine thousand operations done at the Blackfriars Station of the National Vaccine Establishment

since 1859, there was but one single case, which on a second trial was unsuccessful. There may be cases in which for a time the system may have lost its susceptibility, as when pre-occupied by some other disease or perturbation; but this is undoubtedly only for a limited time and in a very limited number of individuals. It is hardly possible for it to extend over a lifetime in the face of so much opposite experience.

The age at which vaccination should be performed is worthy of a moment's consideration. Nearly all countries require that it be done before the end of the first year. In England, the Vaccination Act of 1867, requires the operation to be performed "within three months of birth, or as soon afterwards as the public arrangements of the district in which the family lives will afford opportunity of obtaining gratuitous vaccination." It should be done in all cases before dentition begins or between the first and fourth months. In case the child is out of health or has any skin eruption, it should be got in good condition before the operation.

In case small-pox is prevailing in the vicinity, there is no reason for postponement either on account of age or bad physical condition.

Wolff (*Berl. Klin. Woch.*, No. 17, 1889), reports the vaccination of eight new-born infants, one of two days old, with humanized lymph, and has observed in them the normal development of the pustule, with a complete absence of the vaccine fever. An equally good result was observed in thirty-four other new-born infants, in ten of which the mothers were vaccinated immediately before birth. Fifteen newborn infants were inoculated with animal lymph, and quite as many were successful as is the case in older children. The only point of remark in the two sets of inoculation was the much higher maximum of temperature reached in the cases in which animal virus was used. The author concludes that new-born infants are equally susceptible with older children to vaccination; that the operation is attended with no danger, and that in times of variola epidemics the new-born babes should be vaccinated without delay.

The season of year seems to have no special bearing on the subject. In summer and winter the course of vaccinia is the same. An unprotected infant, no matter how young, who is about to travel in a public conveyance should always be vaccinated before starting.

After Treatment.—Although in any case the amount of suffering attendant on vaccinia is but trifling, when compared to that of the horrible disease which it seeks to prevent, still there are cases where the pruritis is very distressing, and where

the amount of inflammation exceeds the ordinary boundaries and some means of alleviation are called for. In the case of young children, the desire to relieve the itching by scratching is almost uncontrollable, and there is danger of interfering with the integrity and completeness of the process, if this be permitted. To avoid it, the vaccination should be covered with a dossil of lint wet with olive oil and held in place with a few turns of a bandage, the ends of which should be secured by a few stitches. If there is considerable local fever, with swelling and tenderness, much relief will be given by the occasional application of dilute Goulard's lotion (sub-acetate of lead, one part to ten of water). Still better is witch hazel (hamamelis).

In cases of exceptional violence, tending to gangrene, erysipelas, or septicemia, active measures, both medicinal and local, should be used, just as if the same condition had resulted from other causes.

PART VI.

NON-ERUPTIVE CONTAGIOUS DISEASES.

CHAPTER I.

DIPHTHERIA.

Definition.—Diphtheria is an acute, specific and highly dangerous affection, the principal local manifestations of which consist in the formation of more or less extensive patches of pseudo-membrane upon and within the mucous surfaces of the pharynx, larynx and nose. Occasionally it affects other surfaces. It is inoculable, infectious and contagious, and is both endemic and epidemic. Nearly all authorities are agreed that frequently it occurs sporadically. Most cases are attended with swelling of the cervical glands. Clinically, the disease is marked by great constitutional weakness, by irregular fever of low type; frequent albuminuria; by tedious and uncertain convalescence; by a tendency to toxemia which may result in heart failure; and by peculiar paralytic sequele.

It is by no means a new disease. As far back as medical records go, we find described a disease of the throat and upper-air passages, so strikingly like that which we now call diphtheria, that their identity is indisputable.

Sir Morell McKenzie, in his "Treatise on the Diseases of the Throat and Nose," says: "Centuries before the time of Hippocrates, an Indian writer had included in his System of Medicine, a description of a disease, entirely analagous to the one under consideration. This work was originally written in Sanskrit, but a Latin translation was made of it by F. Hessler, and published in 1844, a copy being in the British Museum. The writer says the disease is characterized by an increase of phlegm and blood which causes a swelling in the throat, attended with pain and panting, destroying the vital organs and incurable. He also says: 'A large swelling in the throat, impeding food and drink, and marked by violent feverish symptoms, obstructing the passage of the breath, arising from phlegm combined with blood, is called "closing of the throat."'

All of the older writers, whose works have been preserved, describe in varying language a similar disease and note the terrible mortality attending it. Asclepiades is always cited in this connection as being the first to perform laryngotomy. Areteus of Cappadocia, Galen, Celius Aurebianus and other contemporaneous writers describe it. In the fifth century Aëtius advised against energetic local treatment and the forcible removal of the deposits before they were in a condition to fall off spontaneously." During the dark ages the record is broken, and during the middle ages only references are made to it in connection with gangrene. In this country it appeared as early as the seventeenth century, at Roxbury, Mass.

Samuel Danforth, a graduate of Harvard University, had, in 1643, twelve children. His first child died at the age of six months. According to his biographer, John Langdon Sibley, "the next three, being attacked by the 'malady of bladders in the windpipe,' in December, 1659, it pleased God to take them all away at once, even in one fortnight's time."

During the following century of our colonial history, occasional reference is made to its devastations, especially in Massachusetts, New Jersey and New York. In 1735, the disease appeared in epidemic form at Kingston, N. H., a small inland town some fifty miles eastward of Boston. Dr. Wm. Douglas, at that time a prominent physician of Boston, has given a most graphic description of the disease and its ravages. He called it "putrid sore throat." He says:

"It was first noticed in Kingston township, on the 20th of March, 1735. As this was an inland place of no considerable trade or importance, it was thought (incorrectly, perhaps) to be of indigenous origin, and not of foreign importation. The first victim was a child, who died in three days; and about a week after three children were seized in another family, four miles distant, and they also died on the third day. It continued spreading gradually, seizing here and there particular families, with that degree of violence that of the first forty cases none recovered. Some of the patients died of a sudden, acute necrosis, or mortification; but most of them were carried off by a sympathetic affection of the fauces, neck or air-passages; or by an infiltration and tumefaction of the chops, and forepart of the neck, which became so enlarged and turgid, as to bring upon a level all parts between the chin and sternum, occasioning a strangulation of the patient in a very short time. After a few weeks it spread from Kingston to the neighboring townships, but in a milder form. No reason could be given for this greater malignity in Kingston, except, perhaps, the prevalence of damp places near large ponds, and fresh water, but sluggish streams,

like in those localities which produce the rot in sheep. There may also have been bad medical treatment. Its first recognized appearance in Boston was on the 20th of August, 1735, in a child . . . who had white specks in the throat, and a cutaneous efflorescence. A few more . . . were seized in like manner. Towards the end of September it appeared in several parts of the town of Boston, with more decided complaint of soreness of the throat. The tonsils were swelled and specked ; the uvula was relaxed ; there was slight fever, and an erysipelas or scarlet-fever-like efflorescence on the neck, chest, and extremities. The first alarming case was in the beginning of October, in a young man. He had lately arrived from Exeter, to the eastward of Boston, where his brother had died of the same illness. His symptoms were great prostration of strength. a single speck on one of his tonsils, and colliquative sweats . . . It increased during the winter up to the second week in March, 1736; when it was at its height, there being twenty-four burials in all, during the week (instead of nine or ten). . . . The disease was so much milder in Boston than in some of the townships where it first prevailed, that many could not be persuaded that it was the same disorder. . . . To the eastward of Boston, at times, one in three died, in other places one in four, and in scarce any towns, less than one in six ; whereas in Boston not above one in thirty-five succumbed."

Belknap, in his "History of New Hampshire," states that in that province, not less than one thousand persons died of the disease, of whom nine hundred were under twenty years of age.

Dr. Kearsley, an eminent physician of Philadelphia, writing about the same time, gives an affecting account of its devastations, as he witnessed them. "Like most new diseases," he says, "till their constitution and nature are known, it swept all before it; it baffled every attempt to stop its progress, and seemed by its dire effects to be more like the drawn sword of vengeance to stop the growth of the colonies than the natural progress of disease. In the New England governments the stroke was felt with the greatest severity ; villages were almost depopulated, and parents were left to bewail the loss of their tender offspring, till heaven, at last, the only unerring physician, was pleased to check its baneful influence."

From this early appearance of the disease in this country it has never been entirely absent. A few isolated towns and hamlets may have escaped its invasion, but in the larger cities it is endemic, and the rural districts are rare in which it has not at some time been epidemic.

The name by which we know the disease and which was given it by the registrar-general of England some fifteen years

ago, is the only new feature about it at the present day. Previously it had been known by so many different appellations that an entire page would be necessary to enumerate them. As diphtheria (meaning, to resemble wash leather), it is now known in all civilized countries.

Etiology.—Diphtheria is essentially a disease of childhood, and most common before the age of puberty. Nine-tenths of its recorded victims are under twenty years of age. In this respect it does not differ, at the present day, from the mortality ascribed to it on its first appearance in New England. Sex does not seem to influence it.

It is far more common in the fall and spring—the season of colds—than in mid-summer and mid-winter. Sudden changes of temperature favor it, whether in summer or winter. It is more prevalent in northern than in southern latitudes, although no place is known to be entirely exempt from it. Other affections of the throat, such as tonsilitis, laryngitis, pharyngitis and quinsy, are very commonly associated with it. It is apt to follow or accompany epidemics of measles and scarlatina.

Its contagiousness is everywhere recognized. And yet propagation by direct contagium fails to account for the vast majority of cases, whether occurring in isolation or in epidemics. Fifty different epidemics of diphtheria, occurring in various localities in England, were recently investigated with great care, and in only four could the outbreak be traced to direct contagion. The rest were all connected, according to Dr. W. Gilman Thompson,* with foul cess-pools, deficient drainage, sewerage, or the proximity of dirty animals and decomposing organic matter, such as manure." That unsanitary conditions favor its development and increase its malignancy, goes without saying; but it cannot, however, be considered as essentially a filth-disease. We have seen fatal cases, both in this city and neigboring villages, in houses that were new, and where every sanitary safeguard had been intelligently utilized.

Some twelve years ago the trustees of the Newberry estate erected a block of dwellings on the principal avenue of the north division of Chicago. This avenue was thorough sewered. The foundations of the houses were on sandy soil. The basement story of each was mainly above grade. The houses themselves were of pressed brick, and no expense was spared in their construction. The plumbing throughout was the best that could be had. Money, science and skill were lavished upon them to make them the most desirable tenement homes in the city.

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* See "American Text-Book of Theory and Practice of Medicine," Pepper, 1893.

Among the first of the tenants was a wealthy banker with his wife and one child, some two years old. The latter was a robust, healthy boy who had scarcely suffered a day's illness in his life. But before the family had lived in this new house a year, the child was taken ill with diphtheria and died after a week's sickness. For a month prior to his illness he had not been out of the house, owing to the inclemency of the weather. At the time of his death there was not and had not been a case of diphtheria in the neighborhood, and during that season there was less than the usual amount of the disease in the city. Neither before nor since has there been a serious case of acute illness in the entire block of seven houses.

It would be difficult to defend the theory of filth causation in a case like this. But this is by no means an exceptional one. The writer could instance numerous cases equally in point, and doubtless most physicians in active general practice could do the same. It is a noteworthy fact in connection with the case just cited that the parents of the child had previously lost two children from the same disease and at about the same age. And this brings us to consider the first of the causes which predispose to the disease, namely, *susceptibility*. It is a matter of common observation that certain families are more prone than others to all forms of throat disease, including diphtheria. Many families seem to possess a complete immunity from tonsilitis, pharyngitis and throat affections generally ; while others, equally well apparently in other respects, are continually under treatment for some trouble of the throat. The slightest cold, or even a trifling indigestion, congests the tonsils or produces a local catarrh or inflammation. Such persons are very liable to have diphtheria.

Another of the predisposing causes of diphtheria is age. As already stated, nine-tenths of the mortality from this disease occurs in childhood. All statistics thus far compiled show that the greatest mortality occurs under twelve years of age. After this period the susceptibility gradually diminishes until maturity is reached. In adult life the disease is usually much milder in form and markedly less fatal, although deaths from diphtheria have been known to occur at all ages. While rare in early infancy, Eichhorst and others have known it to be acquired by the new-born. A case well illustrating the usual non-susceptibility of infants is recorded by Dr. J. S. Mitchell. "A lady, aged twenty years, nursing her first child, was under my charge for a severe case of pharyngeal diphtheria. The attack was one of uncommon severity, approaching the malignant type. Her baby nursed regularly throughout the attack, and escaped any sign of the affection."

Season of Year.—Epidemics of diphtheria have been known at all seasons of the year, but it is greatly favored by cold and dampness. Where these two conditions are conjoined, diphtheria is sure to prevail. The mortality in this city from this disease during last year (1892), by months is typical. The mortality for ten or any number of years would show the same relative ratio:

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
117	80	91	62	70	51	32	49	57	118	136	151

But of all the causes predisposing to diphtheria, the foremost one is *cold.* Children are proverbially sensitive to atmospheric changes. They are very prone to hypertrophic catarrhs. Their tonsils are large and very subject to acute inflammation, as is also the whole respiratory tract. The lymphatic system is very subject to disturbance and to nothing sooner than to the effects of cold. An epidemic of diphtheria occurring at Fort Atkinson, a small town in Wisconsin, in the summer of 1885, well illustrates not only how sporadic cases sometimes originate, but also how a sporadic case may start an epidemic of indefinite proportions.

In June of this year (1885), a lad of thirteen took cold from bathing in the river, which runs through the town, and the next day had a sore throat, fever and headache. He had epistaxis several times during the subsequent two days, but he was not regarded as sick enough to call a doctor, and the exact condition of his throat is not recorded. Five days later, an infant of eighteen months old was taken sick with fever and sore throat, and speedily developed a well-defined case of pharyngeal diphtheria, from which it died after an illness of four days. On the day of its death a boy, aged seven, in the same family, was taken sick and died after an illness of three days. During the two weeks subsequent to the illness of the first case, there were ten cases in the immediate neighborhood, with four deaths, showing a mortality of forty per cent. As soon as the disease was recognized as diphtheria, the most rigid quarantine was established. The public school was closed; all social gatherings were abandoned, and the infected families were isolated from their neighbors. In this way the epidemic—for such it was in a small way—was restricted to a single row of houses on the one business street of the small town.

Previous to the outbreak of which we are writing, there had been but one single case of diphtheria known in the township,

and that was some six miles distant and four months earlier. An old physician who had practiced there for over forty years, told me that he had never seen a case of diphtheria in his life.

Instances by the score might be cited where seemingly an ordinary cold, in no way differing in subjective or in objective symptoms from similar colds taken before, have in a given case communicated genuine diphtheria to a susceptible—and usually younger—subject, with fatal results. So often has this happened in our personal experience that we isolate, so far as practicable, all cases of tonsilitis or sore throat attended with exudation or foulness of breath. We regard this as absolutely essential where a sore throat develops in an adult in a family where there are young children.

It should be borne in mind that adults have diphtheria, as a rule, in a much milder form than children, and it is often difficult, if not impossible, to distinguish an innocent and non-contagious sore throat from one capable of communicating a veritable diphtheria to a susceptible child. A person with a sore throat, of whatever character, no matter how simple and innocent it may appear, should never kiss or fondle a child, if it is possible to avoid it. The following case, occurring some years ago, is in point. Mr. G. had just returned to his home from a trip east, and, as he supposed, took cold in the sleeping car. The next day I was sent for and found him suffering from a mild attack of follicular tonsilitis; at all events it had this appearance and nothing more. He had some fever and complained of headache and chilliness. There were perhaps half a dozen spots or patches of exudate on the tonsils which could easily be wiped off with a pledget. There was some dysphagia and the pharynx and uvula were inflamed. He made light of his illness and said he had had a similar sore throat scores of times before. In spite of this I cautioned him about caressing his six-year-old son, who was playing about, and of whom I noticed he was very fond. I treated the case for a couple of days, when I dismissed him, and two days thereafter I met him down town feeling as well as ever. In less than a week I was called to see this only child, above mentioned, who suddenly developed a most malignant case of diphtheria and he died after an illness of five days.

It cannot be too strongly insisted upon that a catarrhal inflammation, wherever located, or however produced, may become diphtheritic and pseudo-membranous. This is in harmony with the observation made by Billroth, that, "Catarrhal conjunctivitis, which is so very common, may become diphtheritic."

In a recent lecture delivered at the Sanitary Institute in London, Dr. Thorne Thorne, C.B., F.R.S., a medical officer of

the Local Government Board of England, expresses himself as fully convinced that diphtheria is disseminated through schools by failure to isolate or exclude pupils suffering with an ordinary or simple sore throat. He says: "Where sore throat ends and diphtheria begins, I cannot say; but no child who is suffering from any form of sore throat should be allowed at school, nor even any one from the house in which that child resides." He gives many statistics to show that in outbreaks of diphtheria in towns and hamlets throughout England, school children are not only first affected, but as a rule those children who do not attend school are for the most part exempt; notwithstanding a considerable epidemic may be prevailing. He further says: "During the cold weather the people all get sore throat, and if you look into their throats, you will always find traces of ulceration, due to past attacks of inflammation of the tonsils. The sore throat—an ordinary sore throat, so far—is passed from one to another (for all forms of sore throat are apparently infectious), and by and by—as I have observed over and over again—it gets worse and worse, until it culminates in an outbreak of diphtheria. The explanation that has occurred to me in respect of these circumstances, is a progressive increase in the infectiousness of the poison which produces diphtheria."

Some years ago (1884), I read a paper before the Illinois Homeopathic Medical Association on "The Cumulative Potency of the Diphtheritic Contagium." In this paper I instanced twenty-seven families in which there had been multiple cases of diphtheria, and in nearly all of which the second or subsequent case was more severe than the first. I cited numerous instances in which the primary case was so mild as to be, in many of them, uncertain of diagnosis; but the second case was severe, critical or fatal. My experience during the past ten years has only served to confirm this observation, and emphasizes the importance of exercising the most rigid quarantine of every case of diphtheria or even of a sore throat, that is at all suspicious of being infectious in its nature. This question has a most practical bearing. Quite recently the press of this city strongly urged the establishment of a diphtheria hospital, where children affected with this disease could be taken and cared for, and where it was supposed they would be under better auspices than at their homes. Such an establishment would only add to the number of fatalities and do infinitely more harm than good. The more contagious diseases are aggregated, the greater the per cent. of mortalities, and with diphtheria this is preëminently true. Isolation of the first case and a quarantine more or less rigid of all forms of sore throat, is the only safe and scientific procedure.

Contagium.—While tender age is a predisposing factor, and cold is frequently an exciting cause of diphtheria, many cases originate from a contagium emanating from some previous case. That the disease is distinctly and markedly contagious, no longer admits of doubt; but we cannot agree with Jacobi, J. Lewis Smith and others, who assert that the contagium extends but a few feet beyond the person infected. Some few years ago we attended the aunt of a two-year-old child, with a moderately severe attack of diphtheria. During the aunt's illness the child crept out of its nursery on the lower floor, climbed the stairs, and peeped through the half-open door of the sick-room. It was during one of my professional visits, and as soon as the child's presence was noticed, it was hurried back to its own room. He was not in the hallway over half a minute, and did not enter the chamber. In spite of this, he took the disease after an incubative period of two days, and died ten days later. As to the nature of the poison which gives to diphtheria its contagious element, authorities differ greatly. To those who accept the germ theory of contagion, it would seem almost sacrilegious to even question the part which microbes play in this disease.

Ever since Buhl first discovered microbes in the diphtheritic deposit, and Hueter and Oertel simultaneously detected them in the subjacent mucous membrane and in the blood of those infected with the disease, no effort has been spared to identify the particular bacillus on which to fix the onus of responsibility. After numerous failures to find a bacillus in diphtheria that could not be found elsewhere, Klebs, in 1883, and Löffler, of Greifswald, in 1884, found one in the exudate and on the adjacent mucous membrane, that so far seems to meet all the necessities of the case; and the particular microbe which the germ theorists, or most of them, now consider to cause diphtheria, is known as the Klebs-Löffler bacillus. The causative relation of the germ to diphtheria is disputed even by some eminent bacteriologists; while there are many, ourselves among the number, who are exceedingly skeptical about germs causing this, or any of the other contagious diseases. For the sake of those who are pursuing the study of the germ theory, and investigating its merits, we give the following description of the *bacillus diphtheria*, as found in Pepper's "American Text-Book of the Theory and Practice of Medicine," page 374.

"The diphtheria bacillus is a little shorter than the tubercle bacillus, but is much broader and has thickened or clubbed extremities. It is sometimes curved, sometimes spindle-shaped. . . . It is capable of deep staining, and then presents a segmented granular appearance. The bacilli often

occur in groups. On the outer surface of the false membrane several varieties of bacilli, including the Klebs-Löffler germ, are found. Immediately below, is a layer containing many cells and but little fibrin, and here, again, the bacilli in groups are apparent. Finally, in the deepest fibrin layer, which rests upon the mucous membrane, no Klebs-Löffler bacilli are present. (Welch, Abbott.) The bacillus diphtheria grows readily in a variety of culture media. It is killed at 58° C. in ten minutes. (Welch, Abbott.)"

The writer from whom this description is taken, Dr. W. Gilman Thompson, says that the bacillus, "comes in contact with the faucial, or other mucous surface, or the abraded skin, and propagates there; but it does not penetrate deeply into the mucous membrane, nor is it taken up by the blood-vessels or lypmhatics. *The bacilli, therefore, do not invade the entire body, but remain at the site of the local lesion, imbedded in the pseudo-membrane.*" (The italics are ours.)

The position taken by the early bacteriologists, that micro-organisms were directly implicated in the causation of disease, was soon found to be untenable. Hiller found microbes in the cadavers of those who had not died of septic disease, and many acute observers failed to find them except in close proximity to the original seat of infection, although there was, as in all severe cases of diphtheria, profound constitutional disturbances. Oertel propounded the theory that, while the inoculation was, by the action of the microbes, causing a local disease, this local disease extended through the organism and became general by means of the absorbents and lymphatics. Narsiloff, Eberth, Klebs, and others, by their experiments and exhaustive researches, endeavor to sustain this view, as do also Obermeir, Pasteur and Koch. On the other hand, Panum, Bergman, Schmeideberg and others have isolated poisons of marked septic power, which contained no bacteria whatsoever. Ramitsch and many others have demonstrated that septic infection is not dependent on the existence of bacteria. It has been shown by Devein and others that an infinitely small amount of chemical poison, entirely free from bacteria, can kill quickly.

It has been found by careful experiments by Hiller, Webber and Hemmer, that the injection of isolated bacteria in large numbers or colonies, into the sub-cutaneous cellular tissue of dogs and rabbits, produced a slight local swelling, but neither abscess nor fever. Hiller injected these into his own subcutaneous cellular tissue, without producing any other effect than a slight edema. After these observations had been repeated and verified by numerous observers, the micro-organisms were carefully classified into disease-producing and

non-producing bacteria; for it was clearly demonstrated that many forms of bacteria were perfectly innocuous.

It was further found that even the septic or disease-producing bacteria were only the indirect producers of mischief. This indirect production of disease phenomena, was explained as due to the agency of "a specific product of the specific microbe, elaborated in the process of its growth or decay, the 'specific product' being in the nature of a peculiar poison possessing not only specific physiological action," but also having peculiar chemical properties and constitutions, which ally them more or less closely to certain well-known poisonous vegetable *alkaloids*. These chemical bodies have received the name of *ptomaines* or *toxines*.

It is claimed that each infectious disease, diphtheria included, not only has its specific bacillus, but a specific ptomaine or toxine—the product thereof—which is the propagating contagium of the particular disease; and it is further claimed that by inoculating a person with the special ptomaine of that disease, such person secures immunity from the effects of subsequent exposure. Many attempts have been made to guard cattle and smaller domestic animals from destruction by infectious or contagious diseases by such inoculation; but such experiments have been thus far only partially successful, and the results are still in doubt.

The theory is fascinating. In some instances the protection afforded by inoculation, notably those of Pasteur in the charbon of sheep, is almost conclusive proof of the truth of the premises; but no sooner does one experimenter report successes than others, equally trustworthy and skillful, report an equal number of signal failures. It may be true, as an enthusiastic writer of recent date says: "The immunity acquired by surviving a natural attack, or an artificial production of the disease, is secured by the action in the tissues of the specific microbe through *its ptomaines;* and this action is probably due both to the restraining effect of the ptomaine itself upon the development of the specific bacterium, which generates it in a manner quite analogous to the effect of alcohol generated in the process of fermentation, in arresting at a certain stage the growth of the microbe which produces it, and to the establishment of a tolerance by the animal organism, for the poisonous alkaloid. When the properties of the various specific ptomaines shall become thoroughly known and well demonstrated, the successful and safe control of epidemic diseases will probably become a matter of certainty." *

* Keating, vol. 1, page 190.

At the present writing this sounds Utopian, and at best it will be a long time before the human family will, by means of a series of inoculations, be rendered exempt from the contagious and infectious foes that hamper its usefulness and threaten its life. The time has not yet come when the germ theory, even as modified by its latest and most conservative exponents, can be accepted as conclusive. There are many facts which go to show that bacteria are merely accidental or incidental factors of secondary influence, when compared with other factors yet undiscovered and hence unknown.

Some years ago Wood and Formad, under the direction of the United States Government, made some original investigations, in order to ascertain the precise rôle played by bacteria in the causation of diphtheria. They made thirty-two experiments. Diphtheritic matter was injected subcutaneously and in the mucous membrane of the mouth. Only six animals died, and of these one case alone presented exudations indicating that death might have occurred from diphtheria. The internal organs of the animals were tuberculous. The results of the experiments of Burden Sanderson, who produced tubercles in guinea pigs by inserting cotton threads in the skin, were further confirmed by Wood and Formad, in their experiments. In Wood's experiments, which consisted in introducing small masses of innocuous foreign substance under the skin, tuberculosis was found in five after death.

Dr. J. S. Mitchell, in his admirable article on diphtheria in Arndt's "System of Medicine," says in this connection:

"Experiments have demonstrated that ammonia, cantharides, and other chemicals, may induce the growth of a pseudo-membrane, when introduced into the system. It has been shown that bryonia has this effect. M. Currie (*British Journal of Homeopathy*, vol. 19, p. 455), made the following experiment: He gave a rabbit increasing doses daily of the tincture of bryonia, until he came to 250 drops, when he developed a firm pseudo-membrane extending from the larynx to the bronchioles of the third degree. It would, therefore, seem that diphtheritic matter, artificially introduced within the body, is not so likely to produce the characteristic lesion of diphtheria as some other substances. Experiments were performed with organic matter to see if products of disease other than diphtheritic exudations would give the pseudo-membrane. The material was pus in four instances. Two of these gave false membrane, so this result was better than where diphtheritic matter was used. The conclusion of Wood and Formad is: The contagious material of diphtheria is really of the nature of a septic poison, which is locally very irritating to the mucous membrane, so

that, when brought in contact with that of the mouth and nose, it produces an intense inflammation without absorption by a local process. While absorption is not necessary for the production of the angina, it is very probable that the poison may act locally after absorption by being carried in the blood to the mucous membrane. Further, under this theory it is possible that the poison of diphtheria may cause an angina which will remain a purely local disorder, no absorption occurring; or a simple local tracheitis, produced by an exposure to cold or some non-specific cause, may produce the septic material, when absorption will cause blood-poisoning, the case ending in adynamic diphtheria.

"Some such explanation as this here offered seems to reconcile the antagonistic opinions concerning the value of local treatment in diphtheria, because it is plain that the value of such treatment must largely depend on whether the angina has, or has not, been produced by absorption. At present it seems altogether improbable that bacteria have any direct action in diphtheria—that is, that they enter the system as bacteria, and develop as such in the system, and cause the symptoms. It is, however, probable that they may act upon the exudation of the trachea, as the yeast-plant acts upon sugar, causing the production of a septic poison which differs from that of ordinary putrefaction, and bears such relations to the system as to cause the systemic symptoms of diphtheria when absorbed. Now, these bacteria may always be in the air, but not in sufficient quantities to cause tracheitis, but enough, when lodged in the membrane, to set up the peculiar fermentation; whilst during an epidemic they may be sufficiently numerous to excite inflammation in a previously healthy throat. The investigations and experiments of Wood and Formad are the most complete and conclusive on this subject which we have yet had, and they confirm the view, long held by some, that the bacteria may fall in showers upon the unprepared mucous membrane, and not induce diphtheria, and that the real etiological factor, or factors, which render it susceptible to their action, are yet unknown."

To sum up the net results of the tireless investigations and experiments that have been carried on in this connection during the past twenty-five years, both in this country and in Europe, by the ablest scientists in the world, it can only be said that the cause, the essential factor in the production of diphtheria—the one element without which the disease is not—is a *poison*; a fact that was known a thousand years before the Christian era. Whence it originates, whether from within or without: whether it be a product of disturbed metabolism—a

sudden vitiation of normal secretions; or whether it be from the inhibition of poisonous emanations from polluted soil, we are just as much in the dark as was Hippocrates or Galen. It is helpful, nevertheless, to call it a "poison," and to treat it as such.

We are not called upon to regard a drug as valuable or valueless, according to its real or supposed power to kill germs. We are left free to revert back to such empirical treatment as clinical experience has indorsed, and to pursue our investigations and researches in the field of therapeutics, solely intent on finding that which will reach and wipe out the symptoms of disease, regardless of germs or their hypothetical ptomaines.

Vitality of the Poison.—However we may regard the nature of the contagious principle, or element, its power for mischief is of very long duration. Like the infection of scarlatina, which it strongly resembles in many other respects, it may retain its poisonous properties for months or even years. In 1888, we saw a case of diphtheria in consultation with Dr. C. E. Williams, of this city. It was a malignant case, and was practically hopeless at the time we saw it. A year or more afterward we were called to see an infant of an old client who had been long absent from the city, and who, on his return, had rented this same house. After the death of the child before alluded to, the house had been thoroughly disinfected—as was supposed—the inner walls had been newly papered, the woodwork repainted and the floors throughout newly carpeted. My friends were ignorant that the house had previously harbored an infectious disease. Their occupancy had scarcely been a full week, when the infant, a year old, was taken ill with diphtheria, and died some nine days later. The only surviving child, a girl of ten years, was sent to a neighbor's as soon as the nature of the disease was recognized; but she developed malignant diphtheria the following morning, and she also died after a brief illness.

In culture experiments, the poison has been known to retain its virulence for sixteen months. According to Sevestre, in a Normandy village, twenty-three years after an epidemic of diphtheria, some of the bodies of those who died of the disease were exhumed and an epidemic at once broke out, first among those who opened the graves, and extended to others. Undoubtedly the diphtheric poison has great tenacity of life and too great precautions cannot be taken to prevent its further spread.

Varieties.—Between the mildest and the malignant form of diphtheria, as it is clinically encountered, there is a vast difference. In concluding a report of a recent investigation of this

question, Abbott says: "From these observations we feel justified in agreeing with the opinion that has been advanced by other observers, particularly Hoffmann and Rowe and Yersin, that under varying conditions the virulence of the true diphtheria bacillus may be observed to fluctuate in the degree of its intensity—at one time possessing the property in a high degree, at another, presenting a decided attenuation, and not unfrequently a complete absence of pathogenic power." If, in the above extract, we substitute for "bacillus," contagium, or "poison," we shall understand how age, susceptibility, constitution, environments, attenuation or concentration of virus, may so modify the disease in a given subject as to render it scarcely distinguishable from some milder affection, or render it so malignant as to be fatal within a few hours.

By some authorities the disease is classified according to the particular region principally affected. Thus, these authorities make a distinct class of pharyngeal, laryngeal, and naso-pharyngeal diphtheria. But there is little practical benefit to be derived from this multiplication of terms. Whether the disease be mild or malignant, it is liable to invade primarily or secondarily any of the mucous orifices; and it may even invade the system through an abrasion of the skin or an open wound, wherever situated. The most common seat of the local lesion, however, is on the tonsils, from whence it is prone to extend into the pharynx, onto the uvula, and the palate, and in a certain proportion of cases it begins in or extends to the larynx, when its dangers are always greatly increased.

Immunity.—There is much difference of opinion among observers as to whether one attack of diphtheria does or does not confer immunity from future danger. The majority of accessible authors is decidedly in favor of the non-protection side of the question. Our own opinion is that in this case, the majority is wrong. In nearly thirty years of continuous general practice, we have never seen diphtheria repeated in the same subject. Having had the disease ourselves in a mild form some seventeen years ago, we have since then attended scores of cases, of all degrees of severity, without a second infection.

In exceptional cases both scarlatina and variola are repeated in the same subject, and the same is true of rubeola. The exceptions, however, only prove the rule. We do not scruple to assure our patients, who have once been attacked by a distinct diphtheria, that they need have no fear of a recurrence.

While diphtheria is indubitably contagious, its infective properties are considerably less than those of scarlet fever. It is not, as a rule, propagated by means of fomites, as is the latter

affection. We have never known a case of diphtheria resulting from a physician carrying the infection in his clothing, although it frequently happens that he is compelled to go from an infected house to one where there are unprotected children.

There is no adequate explanation for this, except that the contagium is quickly dissipated in the outer air or speedily perishes except in confined areas. Dr. Mitchell's theory of accounting for this fact is at least ingenious. He says: "A reasonable theory would seem to be that the physician combines in his person so many of the specific causes of different diseases as not to allow any one to be signally operative."

Incubation.—So many circumstances interfere with observations on this score, and so difficult is it usually to trace the disease to its distinct source, that no certain period of incubation can be given. Doubtless it differs in different cases. In a susceptible subject it may be but a few hours, while in one less susceptible it may be many days. From our own and the observation of others, the period may be said to be from two to seven days—in some cases longer. We have several times noticed the invasion to be two days after known exposure, and in one case it was four days.

Duration.—Diphtheria is a disease of indefinite duration. The average case lasts from ten days to a fortnight. Very mild cases may terminate in a week, while those which are more severe, may last three or four weeks. Cases are on record where complete recovery did not take place until after several months. The sequelæ, such as paralysis and albuminuria, may last indefinitely, although as a rule the duration is not over a few weeks.

Prognosis.—This should always be guarded. The disease is full of pitfalls and disappointments. The prognosis varies in different epidemics. So long as the heart's action is strong and the digestive powers remain good, there is every ground for hope. Under such circumstances, and in the absence of extension of the membrane to the nose or larynx, the prognosis is favorable. If the patient is seen early and is of good constitution, proper treatment ought to afford a good chance for recovery. When diphtheria complicates a case of measles or scarlatina, which has already sapped the vitality of the child, the prognosis is less favorable. The younger the child, the more apt the disease is to prove fatal. The amount of pseudo-membrane is not usually to be depended upon as a criterion for estimating the gravity of the attack. There may be but a few traces of it in the fauces, and yet a great amount of systemic poisoning. On the other hand, the fauces may be thickly covered with a dense membrane and yet recovery take place.

Mortality.—It is very difficult to correctly estimate the mortality from this disease. Many physicians in good professional standing are densely ignorant of its proper diagnosis. They will tell you that they have treated fifty or a hundred cases of diphtheria without losing a single case; while all authorities place the mortality at from 40 to 75 per cent. With 900 cases recently treated in Strasburg, the mortality was 46.7 per cent. In New York City, according to Thompsen, it averages above 47 per cent. and may reach 55 per cent. Over 50 per cent. of deaths from diphtheria occur in children under five years of age, and about 75 per cent. occur among those under ten years of age.

These figures are taken from general current statistics. We have no exact data as to the relative mortality under homeopathic treatment; and it would be unfair to assume superior results without supporting data.

The employment, however, of such heroic measures, both topically and internally, as has characterized old-school methods, based upon the belief that the most powerful germicides were alone equal to combat the hordes of micro-organisms found in and about the pseudo-membranes, could not do otherwise than render mild cases severe ones, and take from many the chance of recovery which would have been theirs had nature been left alone to exercise her restorative powers.

Are True Croup and Diphtheria Identical?—Many of the older writers, and indeed some recent and most reputable authorities, such as Bretonneau, Morell McKenzie, and Sir William Jenner, in Europe, and Jacobi and Loomis in this country, have expressed themselves as believing in the essential identity of diphtheria and cynanche trachealis, or true croup. Others, and among them we must emphatically place ourselves, observe so many vital points of difference between the two diseases that we are constrained to consider them as distinct and separate affections. Diphtheria is a general or constitutional disease of markedly asthenic character, while true or membranous croup, is a local affection of sthenic type. There is always a more or less pungent odor about diphtheria which is absent in croup. Diphtheria, starting in the larynx, seldom or never progresses upward. True croup often does. The importance of the question is most certainly one which can hardly be overestimated, for it has a bearing not only on the therapeutic management, but upon the prognosis and the prophylaxis as well. In order to assist the reader in differentiating the one from the other, and the more clearly to contrast their salient features, we place their more prominent symptoms side by side in the following table of comparison.

Distinctive Diagnosis Between Membranous and Diphtheritic Croup.—The *Pacific Medical and Surgical Journal* presents the following—as abbreviated, with emendations, from Dr. Hugo Engel's statement in the Philadelphia *Medical and Surgical Reporter:*

Membranous Croup.	Laryngeal Diphtheria.
Cause, exposure to cold.	Cause, specific poisoning.
Period of incubation, none.	One to five days or more.
A local history at beginning.	Constitutional.
Constitutional symptoms secondary.	Primary.
Begins in larynx.	In pharynx.
May extend upwards.	Extends downwards.
Affects children only.	Adults also.
Begins suddenly in the night.	Prodromes for some days.
Loss of strength near the end.	From the beginning.
Death from apnea.	Often from ataxia.
No complications.	Nose and heart often implicated.
Albuminuria only towards the last.	From the outset.
Glands not enlarged.	Always enlarged.
Never contagious.	Decidedly contagious.
No sequelæ.	Paralysis often.
Convalescence rapid.	Slow and tedious.
Membrane soluble in potash solution.	Soluble in sulphuric acid.
Hardened by sulphuric acid.	Hardened by potash solution.

Pathology.—It has always been a mooted point as to the relation which the pseudo-membrane bears to the constitutional disorder. By many it is claimed that in the beginning diphtheria is always a local disease, and that if seen in its earliest stages, the poison may be neutralized by judicious treatment, and constitutional infection in this way prevented. This was the opinion of the late Prof. W. F. Knoll, who strongly advocated the topical use of strong carbolic acid. Except in rare instances, the first perceptible lesion is in the fauces, and on the tonsils, and symptoms of general infection are usually not observed until some hours—or days in some cases—after the pseudo-membrane has shown itself. But fatal cases of diphtheria have been recorded in which there was no deposit, either on the tonsils or anywhere in the throat. Thus, M. Trousseau observed cases of diphtheria in a village in the neighborhood of Orleans, where diphtheria prevailed, presenting in some cases its ordinary features; manifesting itself in others by deposits of false membrane on the vulva, or the mammæ, on blistered surfaces or on ulcers, and "proving fatal in some cases without the throat being at all involved in the disease." The great depression of vital powers, which is so characteristic of the disease, sometimes manifests itself even before the throat symptoms, and in malignant cases death has been known to

take place before the real nature of the affection was recognized —the cause of death being only revealed *post-mortem.*

The albuminuria which usually accompanies its severer forms, and may even be present in its milder aspects, is sometimes seen among the earliest symptoms. Again, we sometimes encounter, even quite early in the disease, disordered innervation of the vital centers, showing a close relationship to those affections attended with profound blood-poisoning of which the local manifestations, wherever situated, give but a vague and uncertain indication.

Dr. J. Lewis Smith cites the case of a girl of five years, having malignant diphtheria, to whom he was called in consultation, and who was carefully examined by the attending physician, and, although he closely inspected the fauces, there was no appearance which indicated the nature of the malady till the subsequent day.

In several similar cases which we have observed, there has been for a day, or a portion of a day, prior to visible exudation, complaint of soreness of the throat, or difficulty of swallowing; but the pain and tenderness seemed to be in the deeper tissues of the neck. The treatment of the local inflammation by the most reliable and efficient antiseptics and disinfectants, commenced at the earliest possible moment, and repeated at short intervals, does not prevent the occurrence of indubitable symptoms of blood-poisoning in cases of severe type.

Just why the pseudo-membrane is so prone to show itself first on the tonsils, has never been satisfactorily explained. Extirpation of the tonsils does not prevent infection. In its physical properties, the exudation is identical with the fibrin of the blood. It has an alkaline reaction, swells, and becomes transparent in strong acetic acid, and is disintegrated or dissolved by caustic alkalies. According to Weigert, the fibrin is derived mainly from inflammatory exudation, which transudes from the capillary walls, and which is coagulated by ferment derived from disintegrated leucocytes. The mucous membrane beneath the exudate is more or less necrotic, and the submucous layer is also necrotic in bad cases. As the inflammation subsides, the necrosed portion of mucous membrane sloughs off, together with the pseudo-membrane, and the epithelial surface is restored by outgrowth from neighboring cells.

Several successive membranes may form at the same site, and this is especially the case when they are forcibly stripped off. When left to take its natural course, the exfoliation occupies several days. While the pseudo-membrane is forming, its thin edges shade into the surrounding area of inflammation;

but after a time, if repair is about to begin, the patches thicken and wrinkle about the edges, which become raised above the surrounding unaffected mucous membrane. Sometimes, owing to effusion of serum or ulceration beneath, the pseudo-membrane sloughs off in one entire mass; but more often it melts down imperceptibly, or comes away in fragments. Abrasions of the mucous membrane aid the spread of the virus, by affording new fields for infection; hence the danger of forcibly stripping off the false membrane, and exposing raw, bleeding surfaces.

The lymphatic glands of the neck are apt to be the seat of hyperplasia. This is especially true if the nares are involved. Sometimes the cellular tissue surrounding the gland becomes infiltrated and greatly swollen. In either event, as a rule, the swelling subsides without suppuration. In malignant cases the odor from necrotic tissues is pronounced. There may be deep sloughing or even gangrene at the site of local inflammation, and hemorrhages are not uncommon from various portions of the affected mucous membrane.

The spleen, and the liver also, may become hyperemic. The ventricles of the heart are often dilated; but "heart failure," is due usually to poisoning of the pneumogastric center. Pericarditis is occasionally observed, and in a few instances a granular, or fatty degeneration of the heart walls has been observed. As a result, the heart walls become softer in consistence, and extravasations of blood take place in them.

The kidneys are often the seat of organic changes quite early in the progress of the disease. There is more or less granular deposit in the renal cells, and the cells themselves are often detached so as to block up the tubes. They are mixed with hyaline casts.

Various pathological changes have been noticed in the nervous system, particularly by Charcot and Vulpian, who were the first to record their investigations in this direction. Oertel in 1871 found many extravasations in the substance of the brain, spinal cord, and spinal nerves, in a case where death had occurred from diphtheritic paralysis with general atrophy of muscle. Dejerine, in five cases of death in children from diphtheritic paralysis, found in each instance changes strictly limited to the nerves supplying the paralyzed parts. These changes consisted in a degeneration of the anterior roots similar to that which takes place in the distal end of a nerve after section. He attributed the degeneration to changes in the gray matter of the anterior cornua. Whether the nerve lesion accompanying these paralyses is central or peripheral, is not definitely settled. Vulpian, Abercrombie, Dr. Percy Kidd and others, hold

to the former opinion, while Drs. Hughlings, Jackson, Woakes, and others equally eminent consider that the paralysis is due to a high degree of dilatation of the nerve vessels, and consequent exudation in the nerve sheaths, causing compression of the motor fibers.

In a certain proportion of cases, the skin shows an erythematous eruption strikingly resembling that of scarlatina; but it is not so generally diffused, and does not extend over the surface of the body in the regular way in which it does in the simple form of this latter disease. It is not common for the eruption, however extensive, to be followed by desquamation.

In nasal diphtheria, it is not uncommon for pus to form underneath the pseudo-membrane formed within the nares and perforate the nasal duct, or even to burrow through the overlying cuticle.

Symptoms.—In diphtheria the prodromal symptoms are usually slight and ill-defined, and seldom continue longer than twenty-four or thirty-six hours. They may be wanting altogether. When present they consist of lassitude, headache, muscular pains, fever, and pain on swallowing. In severe cases, there may be chilliness, even rigors, nausea and vomiting, and in infants the disease may be inaugurated with convulsions. Except in very severe cases, the fever does not run high. The temperature is rarely above 101° or 102°. Even in mild cases there is commonly a nasal quality to the voice, which may become more marked as the disease progresses. An examination of the throat shows the fauces to be red and somewhat swollen, but more so on one side than the other. The uvula is usually increased in size and of a bright-red color. On one and sometimes on both tonsils, there will be observed a gray or yellowish-white opaque patch, which seems to be plastered onto the anterior surface. This patch may be round or oval in outline, or perhaps more commonly in the very beginning, appear in streaks, which afterward coalesce into an opaque and tough pseudo-membrane, which seems set in the mucous membrane like a watch-crystal in its case.

In the first few hours of the disease, the exudation may be filmy and transparent in character, resembling that often seen in simple angina; but very soon it becomes opaque, tough and leathery, and dips down into the mucous membrane so that it cannot be detached except by the use of considerable force. In case force is used and a portion of the exudate is torn loose, a raw and ulcerated surface is found beneath, which bleeds, and in a few hours the pseudo-membrane is reformed over its original site and as firm and adherent as before. The tenacity with which this false membrane clings to the deep tissues is

one of the pathognomonic features of the disease. The exudate which is seen in simple or follicular tonsilitis, can be wiped off with little effort, while that of diphtheria must be torn off, if it be artificially removed.

As the disease progresses, the exudation spreads until it covers or may cover both tonsils, the pharynx, the uvula, the pillars of the pharynx, and even portions of the hard palate. Only in very mild cases is the false membrane confined to one tonsil or one side of the throat. The cervical glands are early involved in most cases, and become swollen and tender. The glandular swelling is bilateral and symmetrical. The constitutional symptoms are by this time well marked. The pulse is rapid, 120 or 140, and weak. The first sound of the heart is perceptibly weakened. There is a sense of extreme prostration. The patient feels ill and looks pallid. In some cases there is but little if any pain in deglutition. The nerves of the throat are anesthetic. When pain in swallowing is felt, it is usually more on one side than the other, and generally on the side where there is the least exudation. In mild cases, the exudation loses its tough, leathery character after from two to four days and becomes darker in appearance; it loosens about the edges, which curl up like parchment. It becomes thinner and softer, and either melts away perceptibly, day by day, or is hawked up in shreds or pieces. If the membrane reaches to any great extent the vault of the pharynx, it invades the posterior nares, and comes forward to fill the nasal cavities. When this occurs, the fact is evidenced by a thin, acrid discharge from the nose, of muco-purulent character, which may excoriate the septum, the alæ and upper lip. This discharge is very offensive in odor and may be mixed with blood.

The discharge blocks up the nasal passages and renders mouth-breathing necessary. Young infants cannot suckle and must be fed with a spoon. Nearly all cases of nasal diphtheria are attended by swelling of the glands at the angle of the jaw, owing to their close connection with the lymphatic vessels of the Schneiderian membrane. Indeed, this swelling of the parotid and submaxillary glands may be the first signal that the disease has invaded the nasal passages. Sometimes the connective tissue surrounding the glands becomes infiltrated, so that the entire neck is greatly swollen. Epistaxis is common and may be uncontrollable, owing to the non-coagulability of the blood.

In cases which terminate favorably, the false membrane separates and is not renewed. The swelling subsides, the appetite returns, the pulse becomes stronger, and unless some complication ensues, a slow convalescence begins. Often, however, the

patient succumbs at the end of a week, either from exhaustion, or extension of the false membrane into the larynx, or from some other complication to be presently described. The mind is usually clear to the very end, although, in rare cases, death may be preceded by delirium or coma. Apathy is one of the singular characteristic features of diphtheria. The patient does not complain of pain, usually—only of being tired. Relapses are frequent, either from reinfection of the system, or from other causes, and in such cases chilliness is complained of; the temperature, which has been normal, or but little above normal, suddenly rises to 103° or 104°, sinking again in irregular variations; the pulse is rapid, small and feeble; the eyes are sunken and dull; the strength rapidly diminishes; the prostration is extreme; delirium comes on, and the child quickly dies. The amount of fever in diphtheria varies greatly. Even in bad cases it need not be high. Whether high or low, it affords no criterion by which to estimate the gravity of the attack, unless it be abnormally so. Albuminuria occurs in about two-thirds of the cases, but this does not necessarily imply gravity in the prognosis. Its amount is greater usually in proportion to the amount of the exudate. The early appearance of albumin in the urine—that is, within the first forty-eight hours—only occurs in severe cases. In cases of mild or moderate severity, it does not appear before the third or fourth day. It may be delayed as late as the ninth or tenth day. The urine is of high specific gravity, and contains an excess of urea, with hyaline and granular casts. The kidneys are in a state of mild parenchymatous nephritis; but this passes off as convalescence becomes established, and rarely leaves ill consequences behind. It is rare for uremic symptoms or dropsy to occur.

Laryngeal Diphtheria.—The diphtheritic poison, instead of finding for itself a nidus in the pharynx, may in exceptional cases develop in the larynx, the trachea, or, as in a case we saw some years ago, in the upper bronchi.

When diphtheria invades the larynx primarily, there are no special symptoms by which we can differentiate it from true membranous croup, except in those rare cases in which, by an extension upwards, it involves the pharynx subsequently, and there manifests its distinctive peculiarities. There is no odor to the breath; the dyspnea is not different or greater; and indeed it is practically impossible to distinguish one from the other, except in cases where there is a distinct history of diphtheritic exposure. It is this fact that has led so many high authorities to regard the two diseases as identical.

In the majority of cases of laryngeal diphtheria, however, the larynx is not involved primarily. It is due to an extension

of the inflammation downward from the pharynx. This extension to the air-passages often takes place suddenly and unexpectedly. The preceding symptoms may have been slight and attracted but little attention. There may have been but a modicum of inflammation or exudation in the pharynx. The whole array of symptoms may have been of the mildest type, when suddenly the breathing becomes stridulous, or a croupy cough sounds the first signal of danger.

The symptoms which characterize membranous croup then develop themselves with startling rapidity. Hoarseness follows, which may be quickly succeeded by aphonia. The breathing becomes quick and shallow, or noisy and stertorous. The countenance becomes cyanotic and anxious; the patient sits up or tosses in bed, gasping for breath, the alæ nasi working vigorously with all the accessory respiratory muscles called into action. The breathing is superficial, rapid and irregular. Each inspiration is prolonged and high-pitched; the expirations shorter and harsh. The cough is hoarse or whispering. Owing to obstruction to the entrance of air, the supra-claricular spaces and the lower intercostal spaces are sunken by atmospheric pressure during inspiration.

The patient may cough up pieces of membrane and thus secure a temporary respite from impending death; but the dyspnea soon returns from the re-formation of new membrane. Even where the membrane is not coughed up, the dyspnea is paroxysmal. It lasts from a few minutes to a quarter of an hour, or longer. During the periods of respite the child's terror disappears; his respiration becomes less noisy and stridulous; his respiratory movements are less laborious, and for a time he is in a state of comparative ease. Still the breathing does not altogether resume its natural character. It is rapid and audible. The alæ nasi continue to work violently and some lividity still lingers in the countenance. It is rare that enough membrane is coughed up to afford more than partial relief. The dyspnea recurs at short intervals, and at each recurrence is more severe than before, so that the child is speedily exhausted in strength or passes into a state of semi-asphyxiation. The forehead becomes clammy and the extremities cold. The lips become purple and the face livid. Usually, if not relieved by tracheotomy or intubation, the child does not survive more than twenty-four or thirty-six hours from the time when the larynx was first involved. Sometimes, however, if the false membrane is of limited extent, or is confined to the lower portion of the larynx, recovery may take place. In other cases when the child's strength is good and time is given for the action of suitable remedies, a favorable change

may take place and the stenosis be relieved by coughing up a considerable portion of membrane, which is not thereafter renewed. An extension of diphtheria into the nares is always attended with danger, and into the larynx with almost necessarily fatal results, unless surgical measures are promptly resorted to, in which case life may be at least prolonged, and in some cases undoubtedly saved. Laryngeal diphtheria, however, must be regarded as the most fatal of all infantile maladies.

Complications and Sequelæ.—Diphtheria is more apt to complicate other diseases, such as measles and scarlatina, than to itself be complicated by them. The extension of the false membrane into the larynx or the trachea, in the course of an attack of diphtheria, is the most serious of these complications. The presence of albumin in the urine is by all means the most common, occurring in probably two-thirds of the cases, regardless of gravity. But its presence or absence is not to be seriously regarded. In rare cases there is local edema, and possibly anasarca; but the nephritis which is set up by the diphtheria is usually of temporary duration and trifling in results.

Among the sequelæ, paralysis of local muscles is exceedingly common, and is liable to follow in the wake of the disease, however mild the attack may have been. This paralysis may be partial, amounting to slight impairment of function, or it may be complete. It may be, and commonly is, limited to a single group of muscles, or it may involve in succession almost the whole voluntary muscular system. The advent of these paralyses is always insidious, and, as a rule, is noticeable during the second or third week of convalescence. Trousseau mentions a case in which the paralysis manifested itself some days before the complete disappearance of the false membrane. McKenzie states that the paralysis may develop as late as the sixth week of convalescence. In all cases their advance is gradual, and they may continue to extend for several weeks after their first appearance. The muscles most frequently affected are those of the soft palate, the eyes, and those of the extremities. When the former are affected, a nasal tone is given to the voice, and there is difficulty in phonation, owing to the impossibility of closing the naso-pharyngeal passage. A patient thus will pronounce rub, *rum*, head, *hent*, and egg, *enk*. In connection with indistinct articulation, there is frequently strabismus, dilatation of pupils, and imperfect vision. The taste is often more or less blunted, and sometimes the power of expectoration is lost. In some cases there is impairment of the pneumogastric, and a nervous cough is developed, or the respiration becomes sighing, as if from exhaustion. A year ago we took care of a pair of

twins, five years old, simultaneously sick with mild diphtheria. During convalescene the little boy began twitching his eyelids, and this involuntary muscular action subsequently extended to nearly all parts of the body. After a month or six weeks he made a good recovery, and has not been troubled since. Some six months after recovery from the diphtheria, his twin sister began sighing at frequent but irregular intervals, and this increased to such an extent that she was brought back to me for treatment, and she also made a good recovery in the course of a few weeks.

Paralysis of the extremities is occasionally met with, but is seldom complete, being generally of an ataxic character, rendering the movements uncertain, tottering or hesitating. In such cases there is numbness and tingling in the affected members. Cardiac syncope is not uncommon, even in cases that show no other sign or evidence of neurotic complication. It is not without danger, as numerous cases are recorded of sudden death after convalescence was supposed to be well established. Violent exercise should be strictly prohibited to those who are recovering from diphtheria, until a full restoration of strength has been secured.

There is some tendency of the diphtheritic membrane to extend down the esophagus, and invade the stomach. It is in such cases that we have such repugnance to and intolerance of food. Vomiting is frequent, although not always present. Epigastric and precordial pain is usually complained of, and is sometimes a marked and distressing symptom.

Treatment.—The successful treatment of diphtheria must be based upon the law of similia. Any other treatment must be empirical, uncertain and unsafe. As we have seen in the preceding pages, the disease in its malignant form is characterized by profound depression of the vital forces, and a demoralization of the blood arises in consequence.

This is sometimes manifested prior to the visible formation of any distinctive false membrane, either in the throat or elsewhere. In such cases any attempt to abort or control the disease by local applications would be manifestly absurd. Even where, as is the case usually, the formation of false membrane precedes the constitutional symptoms, the employment of escharotics and germicides, with the hope of destroying the poison at the seat of infection, has proven a dismal failure in the vast majority of cases. In saying this we do not mean to decry the use of local measures altogether, for we firmly believe in them—some of them—as will be seen presently. What we do mean is, that the use of strong carbolic acid, nitrate of silver, or the bichloride of mercury, as a destroyer of germs,

and therefore a remedy for this disease, is not sanctioned by common sense, by scientific study, nor by clinical experience.

In the milder forms of the disease, we are confident that such measures as we have just mentioned are not only useless but most pernicious. There are antiseptics of the first class, which are entirely free from objection, that could not do harm if applied properly to a throat in perfect health, and which nevertheless are of accredited germicidal power, and of proven efficacy. One of the best of these and one that has stood the longest clinical test is permanganate of potash. It has no equal as a deodorizer. It can be used as a gargle, if the patient is old enough, or it may be used as a spray by any form of atomizer. One of the best methods of using this or any of the other antiseptics is by means of an Alpha syringe with an acorn tip. This throws a continuous stream, and it can be used as a nasal douche, or it can be made to reach the post-nasal and pharyngeal surfaces at will. While the permanganate is quite harmless if taken in tangible doses, its effects are secured by using it in the strength of one or two grains to the ounce of water.

Eucalyptol is a remedy highly spoken of by Dr. E. M. Hale. The liquor calcis chlor. has many advocates, and is highly praised by Neidhard; but its efficiency seems to be limited to mild cases, in which there is but little false membrane.

But the local remedy *par excellence*, is peroxide of hydrogen. It has many advantages over any other, and can be used by spray, lavage, gargling or douching. It can be swallowed, even by infants, semi-diluted, with impunity. In taste it is scarcely less disagreeable than water. It has no toxic dose. Pus cannot exist in its presence. It is deoderant and germicidal. It loosens the false membrane from its attachments by destroying the purulent matter underneath and around it, and thus hastens its elimination. It does more than this. When brought into contact with the mucous surfaces, it is absorbed to a greater or less extent, and thus assists in the essential process of blood oxydation and purification. In other words, its antiseptic properties extend beyond local contact, and it helps, besides, the oxygenation of the blood, thus acting as a powerful volatile stimulant.

In order to secure the best results from the use of the peroxide, certain precautions must be taken. So far as our present knowledge goes, that prepared by Charles Marchand is the best. Even this preparation is very unstable and rapidly deteriorates unless kept well corked, and in a cool place. For this reason, although needed in large quantities, it should be obtained in the smallest packages (4 oz.), and these should

only be opened as required for immediate use. The 15 volume strength is to be preferred. In the early stages of the disease, this strength can be used by spray without dilution. The oxygen contained in this preparation has a strong affinity for all metals except gold, silver and platinum, and hence, the atomizer used should consist only of glass and rubber. When the peroxide is first used in full strength, it produces a slight smarting sensation ; but this is trifling and no irritation results. When thrown up the nose it should be diluted one-half with water. If by reason of a too copious or too violent irrigation, the patient should swallow any considerate portion of the liquid, no apprehension need be felt, for we often give it in this way for its antiseptic influence over the false membrane which has been disintegrated and taken into the stomach. It should be used as often as the strength of the patient will permit. In the early stages this means at least once an hour.

There are many other local applications which have their advocates, but they are not to be compared with those which have just been named. Boracic acid, chlorate of potash, bromine, iodine, bichloride of mercury, and a long list of other remedies have been tried and found wanting. They all have objectionable features which render them either unreliable or unsafe for general use. Every now and again the newspapers teem with some old woman's remedy which has been, or seems to have been, useful in cases of diphtheria. The laity are much given to credit any story of a case cured, even by such apocryphal means, and as these measures are generally harmless, if impotent, the best way seems to be to permit their use, under protest or without, while other and better accredited remedies are being actively employed.

In case the domestic or empirical remedy is of questionable innocency, the onus of responsibility for its use should be thrown upon the user. Thus, if one is asked if a certain remedy or measure of unknown value suggested by the patient's friends or nurse may be used, the best disposition to be made of the matter is to say, "Why yes, certainly, use it if you choose ; *but you must take the responsibility of doing so.* Thus we hear all the time about the local application of sulphur, of lemon juice, of pineapple juice, etc., and of the most incredible cures effected by their miraculous powers ; and while the experienced physician may know of their utter incompetency, it is cruel to deprive an anxious and despairing parent of even a ray of hope thus furnished, even though he may know that even this ray is purely fanciful.

Internal Treatment.—The drug which comes the nearest to being a true similimum of diphtheria in its gravest aspects is

mercurius, and the physician who achieved the greatest success in the treatment of it in the colonial outbreak which marked its advent into this country, referred to in the beginning of this chapter, was Dr. Douglas, of Boston, who succeeded in saving many cases by the heroic use of calomel. It was the first time in America that mercury was used in acute inflammatory affections. At the present day it is used by both schools of medicine successfully, but of course in very different preparations and doses. Old-school physicians report a great many cases treated successfully with the bichloride in doses of one-tenth to one-sixtieth of a grain, repeated every few hours until the membrane is detached. Others of this school still prefer the time-honored "mild chloride" (calomel) in doses of one to five grains every one or two hours till its characteristic purgation is produced. Our own school, using the same drug in the third, the thirtieth or the one-hundredth attenuation, seems to have precisely the same success, which demonstrates, as clearly as a single illustration can prove a thing, that it is not the quantity, but the specific power of the medicine, which renders it curative. The particular preparation of mercury (mercurius) which is best adapted to these cases is not well settled. Some physicians prefer the *cyanuret of mercury;* others the *iodides*, especially in strumous subjects. All of the mercurial preparations present a fairly good picture of diphtheria. Our own preference is for merc. cor. in cases where there is a large amount of exudate, great fetor and also great prostration. We prefer the iodide of mercury when the glands are much involved and the neck is greatly swollen. It is especially useful in scrofulous subjects as already stated, and is well adapted to those cases which early show a tendency to malignancy. The countenance is livid and the discharges from both throat and nose are putrid; the saliva is profuse and stringy. There is also great pain in swallowing. *Kali bichromicum* undoubtedly ranks next to mercurius as truly homeopathic to diphtheria. In mild cases or those of moderate intensity, it often takes first rank. It is especially indicated in those cases which show a tendency to laryngeal complication. Dr. Richard Hughes, of London, says of kali bich., "In nasal diphtheria I find it specific; in laryngeal, it does all that medicine can do." Dr. Mitchell says the special indications are: "Mucous membrane deeply affected and ulcerated; pain in the throat; painful, difficult swallowing; stringy, tough mucus; the exudation is of a yellowish or yellowish-white color, and is of a firm, fibrous nature, thrown out in large quantities, covering both tonsils and tending to extend into the nares and larynx. The characteristic difference," he adds,

"between kali bich. and merc. iod., is the more fibrinous consistency of the exudate under kali, while mercury has a softer and more pasty pseudo-membrane." Kali should be given in solution. Two to three grains of the 3x should be dissolved in half a glass of water, and a teaspoonful of this given every hour, or every half-hour if the case is urgent.

In malignant cases, where there is considerable exudate of a dirty brown color, of tough consistence, and great fetor of breath, we give the kali in trituration, depositing it directly on the affected surfaces by means of a powder-blower, repeating the operation at intervals of one or two hours until there is a manifest amelioration of symptoms.

The attempt has been made to dispose of the pseudo-membrane, and thus get rid of at least the outward and visible signs of the disease by means of certain digests, such as pepsin and papoid, but without success. All such efforts are based upon a very superficial and erroneous idea of the true nature and real danger of the affection. It cannot be too frequently or too emphatically stated that diphtheria is a systemic or general disease; in all cases, to a greater or less extent, infecting the entire organism, the pseudo-membrane being in some cases more prominent than in others, but never in any case constituting the entire malady. It would certainly show poor generalship—to use an army simile—to concentrate all or most of one's forces on a single outpost, while the main body of the enemy was known to be in ambush in the immediate vicinity.

Arsenicum.—This remedy is not used in diphtheria as often as it should be. It is very useful in some malignant forms, accompanied by great debility, pallid countenance, puffiness of face and eyes, urine scanty, feeble pulse, acrid discharge from nose, very fetid breath and painful deglutition.

Apis mel.—Uvula elongated and edematous; puffiness of mucous membrane extending onto hard palate; urine scanty or suppressed; burning and stinging dryness of throat; swelling of the cervical and submaxillary glands; where there is edema of the glottis; fiery redness or puffiness of a purplish tint; very useful in cases of laryngeal diphtheria, when other symptoms as above correspond.

Arum triphyllum.—The indications for this remedy are fetid breath and great acridity of discharges from mouth and nose; discharges excoriate and form large crusts about the orifices; diphtheritic deposit excessive and mixed with more or less ulceration. The acrid character of the discharges creeping beyond the mucous membrane and affecting the adjacent skin, is the key-note for this drug.

Lachesis.—Malignant cases: exudation worse on left side;

mucous membrane livid; great difficulty and pain on swallowing; great weakness; delirium well marked; bad-smelling stools; ulceration of mucous membrane. The marked characteristics of lachesis are lividity of mucous membrane; inflammation worse on left side, and painful deglutition.

Ferrum perchloride.—The tincture of the perchloride of iron, as well as the muriatic tr., are used extensively by the old school of practice, and apparently with good results. They use these iron preparations both locally and internally. There is no doubt that iron, if presented in an assimilable form, may counteract, to some extent, at least, the anemia which attends all cases of diphtheria; but even as a tonic our ferrum met. and ferrum phos. are superior to the crude tinctures.

Dr. Hale suggests that as *muriatic acid* is of known value in these cases, that it is the combined acids in these iron preparations that render them useful, rather than the metal itself. The indications for them are not clear; at least they are not clearly defined as compared with other remedies already spoken of, or to be mentioned hereafter. They may perhaps be used with advantage intercurrently with other medicines more specifically indicated.

Phytolacca.—Is very useful in cases of mild or moderate intensity, attended with pain on movements of tongue and neck; adapted to cases that in the beginning simulate follicular tonsilitis, but with fetor of breath and weakness unusual to this latter disease; in addition to prostration there is drowsiness; constant inclination to swallow; nausea, vomiting and diarrhea. This remedy is of no value in malignant cases.

M. Teste, of Paris, is a strong advocate of the use of *bromine* in diphtheria. His high standing and large experience in this disease entitle his opinion to more than ordinary weight. He gives the bromine in solution, the strength of which is one grain to one hundred drops of water. Of this he gives two to three drops in a little sweetened water every quarter of an hour, or less often in mild cases. He also advocates the free evaporization of the medicine in the sick room, both as a further means of cure and as a prophylactic for nurses and attendants.

Treatment of Complications and Sequelæ.—It has already been stated that next to diphtheritic croup, the complication most to be dreaded is *heart syncope*. It cannot be too strongly impressed upon the mind of the reader that the *real* danger in diphtheria—the one factor in the disease that is of graver import than any other—is exhaustion of strength (vitality). This is a danger that menaces all cases, mild as well as malignant. This danger increases, of course, as the severity of the attack increases, and it remains a menace even after all visible manifestations of the

disease have vanished. The peril from suffocation, even in laryngeal cases, is small compared with this danger from exhaustion of the vital energies.

In the most malignant case, nature will ultimately overcome her enemy, if the strength can be kept up, and the deposit can be arrested. In trying to meet the requirements of imperiled cases from this cause, we are handicapped by repugnance to food, and the apathy which fails to appreciate the necessity of eating. The difficulty of swallowing renders it necessary to employ foods and stimulants in the most concentrated form. We make bold to say that for the purpose here indicated *alcohol* is our "sheet-anchor." It should not be given in the form of milk punch or egg nog. Wines are of uncertain value; good brandy is difficult to obtain. Old rye whisky will answer a good purpose; but in lieu of this, pure (95 per cent.) alcohol will be found most available. This should be given in small and repeated doses, sufficiently diluted to be easily swallowed. A little sugar may be added to render it more smooth and palatable. In very bad cases, this should be given to the verge of intoxication. It is not only a quick stimulant, it is more—it is one of the best antiseptics known. It is interesting to note with what facility it dissolves the diphtheritic exudation in the throat, lowers the temperature, and calms the pulse. In young children and infants it should be used tentatively and with due caution; but it is our firm belief that alcohol, when properly used, has saved more lives than any other one remedy. When whisky is used it should be given in the form of "sling" or "toddy," *i. e.*, mixed with hot water and sugar. If alcohol is used in any form, it should be given regularly and systematically. It is the "little and often," rather than the toxic dose, that is desired. During convalescence the heart should be examined at every visit, and if its action is enfeebled or any irregularity is noticeable, *cactus* (or *cactina*, its active principle), with *nux vomica*, should be given. "*Digitalis* and *strophanthus* are close analogues of cactus, and can be given in similar doses; but they are not as well borne by the stomach, being bitter and nauseous, while cactus is quite tasteless."—*Hale.*

Cactina can be used in tincture, or trituration, or can be injected hypodermically. A grain of the first centesimal trituration is equal to one drop of a good tincture.

If sudden collapse is threatened, a hundredth of a grain or drop of *glonoin* may be given first, for its immediate effect, and the cactus may be given afterwards. If the respiratory function is threatened with collapse, a drop or two of *amyl nitrite* may be given by inhalation, and followed by cactus or digitalis or veratrum album.

In paralyses that do not immediately threaten the heart, such as chorea, sighing respiration, local paralysis of certain muscles or groups of muscles, *gelsemium* is almost a specific. If the limbs are paralyzed, *strychnia phosphate* 2x, a grain three or four times daily, may be given until they regain their power. In some cases that are slow to recover, we have seen immediate and steady improvement manifested under the use of the faradic current. It should be used daily as strong as can be borne without discomfort.

INTUBATION AND TRACHEOTOMY.—It must be conceded that the internal treatment of laryngeal diphtheria has not been attended with that success which inspires either hope or confidence. Cases undoubtedly do recover—enough to encourage effort and prevent despair; but, except in primary cases and in robust constitutions, when the false membrane extends from the pharynx below the epiglottis and invades the larynx, the recoveries are few and far between. The danger of suffocation stares us in the face, and remedies calculated to remove the stenosis are too slow of action to meet the emergency.

Tracheotomy, which has undoubtedly saved many cases of membranous croup, is practically inadmissible here, for the temporary and transient relief of the stenosis is almost certain to open the door to *auto*-infection through the surgical wound. Besides this the shock of the operation is to be considered. Statistics of tracheotomy in laryngeal diphtheria do not or have not shown a sufficient number of proportionate recoveries to give it standing even as a *dernier ressort*.

O'Dwyer's method of relieving the stenosis by means of intubation has much to recommend it. At the same time, its best results are secured only by an expert operator. It is not an easy matter to discover the location of the laryngeal orifice, and to insert the tubes while an inexperienced nurse or a nervous mother is handling a refractory and half suffocated child.

The best results from intubation are therefore found in hospital practice; but there is no reason why any physician should not make himself familiar with the operation. A thorough knowledge of the anatomy of the parts; a deftness in the manipulation of the requisite appliances; a little experience on a cadaver, and one or two trained assistants are all that are requisite. Even the most desperate cases have been known to recover through this instrumentality, although it must be borne in mind that cases requiring or seeming to require intubation are, generally speaking, cases that have passed the local manifestations of the disease, and are suffering not only from stenosis, but from general blood-poisoning as well.

When intubation fails we have no confidence in tracheotomy as a last resort.

HYGIENIC MANAGEMENT.—Much can be done for these cases of diphtheria in an auxiliary and hygienic way. Children who are subject to catarrh or to inflammatory affections of the throat should be carefully looked after during epidemics of diphtheria. It is just this class of children in whom, at any time, the disease may develop spontaneously. Such persons should avoid crowded gatherings where the air is likely to be vitiated, as theaters, public halls, and even churches. This is especially important during cold weather, if diphtheria be prevalent. In case the disease develops in a family where there are others of susceptible age, the greatest care should be taken to prevent its spread.

The diphtheritic contagium is cumulative and the second case in a family is apt to be worse than the first. *Great caution should be used about kissing and fondling a child with sore throat, no matter how innocent it may appear.* Dogs, cats, sheep and swine, all have diphtheria, and, hence, are dangerous as pets, especially during epidemics of diphtheria.

A person with this disease should be rigidly isolated. A large room on the upper floor should be selected by preference, and with a grate in it, if possible. A southern exposure is to be preferred. Measures should be taken to secure plenty of fresh air. The window sashes should be open top and bottom, and a screen thrown about the bed to protect the patient from currents of air. In laryngeal diphtheria the temperature may be kept as high as 76° or 80° Fahr., but in uncomplicated cases 68° or 70° is better. The greatest care should be taken to avoid disseminating the disease by fomites. The sick room should be dismantled, and all unnecessary furniture, carpets and hangings should be removed. Instead of handkerchiefs, bits of old linen or cotton should be used, and burned as soon as no longer needed. All earthen vessels should be frequently cleansed and disinfected with Platt's chlorides or chloralum. Sheets hung up in the doorways and moistened occasionally with these liquids prevent the contagium from disseminating itself unnecessarily abroad.

The diet should be of the most concentrated and nourishing kind, and yet great care must be taken not to offend the stomach. Everything may depend on the maintenance of the digestive powers. Repugnance for foods is often great and unconquerable. Only such foods should be urged upon the patient as are easily swallowed, and easily digested. Milk, beef juice, Murdock's food—any of these may be given, and in

case of stomach intolerance the rectum should be used. The rule for feeding should be little and often.

If stimulants are used, they should be given with great regularity and system. During convalescence great care must be used to avoid over-exertion or exercise that would tend to excite undue action of the heart.

CHAPTER II.

WHOOPING COUGH (PERTUSSIS; TUSSIS CONVULSIVA).

Definition.—Whooping cough is an acute disease of the air passages, having a specific contagium, and is inclined to be epidemic in character. It is distinctively a disease of childhood, and its chief characteristic is the spasmodic cough, which, in typical cases, comes in paroxysms and is terminated by a long-drawn, audible inspiration, called the "whoop"—hence the name. It is a disease of most ancient date and of the highest respectability, so far as its democratic tendencies are concerned. It is one of the few diseases that are not attributed to filth. Its cause is unknown. It has been regarded as an affection of the stomach, as a species of catarrh, as a neurosis. There are those whose temerity is such, that they do not scruple to regard it as of microbic origin. The "*bacillus tussis convulsivæ*" has been isolated, cultivated and classified. And yet the latest writer on the disease,* says, speaking of the various untenable theories held prior to the beginning of the present century: "The lapse of nearly a century has not entirely cleared up these obscurities as to nature and cause, nor relieved the practice of medicine of the odium of polypharmacy in treatment."

The latest researches in pathology indicate that it has no morbid anatomy except in its complications. One attack confers as much immunity on its victims as does scarlatina or variola on theirs—perhaps more so. Sucklings are immune. Its principal victims are between six months and six years of age—most of them under four. For some inexplicable reason, the female sex suffers most, in the proportion, according to nearly all authors, of 5 to 4. Girls also suffer more severely than boys. Measles and pregnancy predispose to it. It is prevalent at all seasons of the year, but more so during the autumn and spring.

Symptoms.—For clinical study, the disease may be conveniently divided into stages. Thus: 1st, catarrhal; 2d, spasmodic or convulsive; 3d, remission or decline. The first and third stages are oftentimes but poorly defined—the former especially so. The middle or convulsive stage is also frequently wanting

* Dr. James L. Whittaker in Pepper's "Text Book," etc.

in positive characteristics, no definite "whoop" being manifest. During the first or catarrhal stage, there are no special symptoms that distinguish it from an ordinary cold. The spasmodic character of the cough is usually not developed until later, and all that can be discovered in the average subject is a cough of catarrhal character; but this cough does not yield to remedies like that which comes from an ordinary cold. It persists in spite of well-chosen and ordinarily successful remedies. In many cases, however, the symptoms are more pronounced, and it is noticeable that the cough is easily excited by swallowing anything of a dry nature, such as crackers or dry bread—anything, in fact, that irritates the throat. It is also noticeable that the cough is inclined to be paroxysmal, especially at night; the eyes are somewhat puffy, and the face takes on a swollen and sallow look, as if there were some deeper-seated trouble than should come from a transient and trifling cause. An examination of the chest during this first stage sheds but little light upon the true nature of the disease. Some bronchial râles may be heard by aid of the stethoscope, but no more than are heard in the incipiency of the mildest bronchitis. As the disease progresses, however, the symptoms become more pronounced; the cough becomes gradually more paroxysmal, and at the termination of each paroxysm, there is an expulsion of phlegm from the bronchi, often accompanied with vomiting or gagging. As with other febrile conditions, the child may be pretty well during the day, with good appetite and little indication of sickness; or, on the other hand, there may be considerable fever, accompanied with fits of coughing and fretfulness and loss of appetite. Even now there are nocturnal exacerbations. While quietly sleeping there will be a sudden onset of cough, more or less severe, but always enough to awaken the patient and prevent continuous slumber. Auscultation during the first stage, as already stated, may reveal a slight bronchitis or bronchial catarrh affecting the larger tubes; but, as a rule, the cough and the general symptoms of ill-health are out of all proportion to the physical signs. During the day the patient is up and dressed, but becomes restless and anxious just before a paroxysm of cough approaches. The child early learns to dread these paroxysms, and as soon as one is felt to be approaching he instinctively runs to his nurse or mother for support. In their absence, he seizes the nearest thing to him, be it chair or table, and clings to it tenaciously until the paroxysm is over. The duration of these seizures is various, lasting from a quarter of a minute to a minute or more. In typical cases the cough is attended with flushing of the face and suffusion of the eyes, and each par-

oxysm is accompanied with vomiting. During the catarrhal stage there is commonly more or less fever; but many cases run their course from beginning to end with no perceptible rise in temperature. When fever exists, it is most noticeable at bed-time, and the cough is strongly inclined to exhibit its peculiarities at night. It arouses the child from the profoundest slumber, into which he relapses again as soon as the paroxysm is over. The different stages of the disease are exceedingly variable in duration. Sometimes the first or catarrhal stage lasts but a few days, while in other cases it may last for weeks. The stage of decline is especially indefinite. An attack beginning in the fall or early winter is pretty sure to last until the following spring or summer. The cough is greatly aggravated by breathing cold air, and sensitiveness to cold remains with the subjects of whooping cough for months after the disease is apparently over. In the middle or convulsive stage the neurotic element asserts itself and is more or less pronounced. The seizures are sudden, and yet the child is prone to feel a premonition of its approach—a sort of aura which previous experience has rendered recognizable. It is a sense of impending danger, or feeling of distress, which impels the victim to leave its play or study or meal, as the case may be, and seek the most available succor. Thereupon ensues the series of expiratory coughs that distinguishes the disease from all other affections of the respiratory organs. Goodheart likens it to the attack which one experiences when, in swallowing liquids, a drop or two gets into the rima glottidis. There is the same sudden onset of a number of rapidly succeeding expiratory coughs, till the face becomes turgid and the eyeballs start from their sockets and the eyes run over with tears. There is frequently at the termination of such an attack the semblance of a whoop or a crow, which is due to the rapid influx of air to satisfy the respiratory needs, which have become urgent by reason of the successive and exhaustive expiratory efforts.

The paroxysms occur in every grade of frequency and severity. They are often so mild as to lose all distinctive characteristics, and in other cases are so severe as to cause rupture of blood-vessels. Hemorrhages often occur from nose and mouth. It is not at all uncommon for subconjunctival hemorrhages to occur. The membrana tympani occasionally ruptures and is accompanied by bleeding from the external meatus. We have a case now under observation where hemorrhage occurred in the brain, producing catalepsy. This accident happened some five years ago, when the child was two years old. Hernia is not uncommon, nor prolapsus ani. Convulsions are also

possible. The frequency of the paroxysmal attacks of cough varies all the way from ten or twelve daily, to double or quadruple this number. The severity of the disease is in direct ratio to the number and intensity of the paroxysms. During the intervals between paroxysms, the child is to all appearances in perfect health. Even when the attacks of coughing are frequent at night, arousing the child from profound slumber at short intervals and causing it to struggle fiercely for air, it falls asleep again immediately the attack is over, and awakens in the morning without a sign of fatigue.

The expulsion of a quantity of ropy, tenacious mucus at the end of each paroxysm of coughing is an essential feature of the disease.

A curious symptom is present in the great majority of severe cases, but is incidental rather than essential to the disease proper. It consists in the appearance of an ulcer on the frenum linguæ. This lesion was observed so constantly as to give rise to the belief that it had a causal relation to the disease; but it is now known that it is caused by the friction of the protruded tongue against the inferior incisors. It is never observed in cases that occur in children prior to dentition.

The paroxysmal stage lasts as a rule from one to four weeks, when the interval between paroxysms becomes gradually longer and the explosions themselves less severe and prolonged. During the stage of decline, however, there may be occasional paroxysms of former severity, and it is no uncommon thing for these explosions to recur with such original intensity and frequency as to seem like a veritable relapse. In this way this third stage of the disease is often greatly prolonged, lasting sometimes as long as a month or more. There are cases in which the patient is said never to have recovered from the disease. But when cases like these are unduly prolonged, it is doubtless due to complications to be spoken of hereafter, such as chronic bronchitis, bronchiectasis or tuberculosis.

It is worthy of note that all during the course of the disease any excitement, such as anger or boisterous play, is sure to precipitate a paroxysm of cough and intensify its severity.

Complications.—Whooping cough is liable to innumerable complications, and these constitute the really dangerous element in the disease. There is always more or less bronchitis from the first, and the râles which accompany bronchitis are usually so pronounced that they drown all other respiratory sounds. Any disease attended with bronchitis is also liable to broncho-pneumonia, and hence the latter is by far the most frequent of the serious complications of whooping cough.

Convulsions, usually of a clonic character, are very apt to complicate the disease, from the congestion of the cerebral veins and sinuses, produced by the explosive force of the cough. These convulsions, affecting for the most part the external muscles, occur most frequently during the second stage of the disease, when the cough is most severe, and in infancy more often than in childhood. As stated by J. Lewis Smith, the gravity of the convulsive attack can be ascertained by observing whether or not the patient readily recovers consciousness. Its return indicates that there is no serious congestion. On the other hand, great and persistent drowsiness, or a semi-comatose condition, indicates profound congestion, and perhaps even the formation of clots in the sinuses of the brain. Death from convulsions is usually preceded by coma.

The spasmodic closure of the glottis, and the powerful efforts of the expiratory muscles, sometimes develop edema of the glottis, and sometimes—perhaps more frequently—emphysema of the lungs. When the latter occurs, it is usually slight, marginal or peripheral, and is marked by dilatation only of the air-cells. Occasionally the dividing walls are broken, and the air-cells are ruptured, and a pneumothorax developed.

Vomiting, which is an almost universal accompaniment of severe, or even well-marked cases, may be so severe and persistent as to constitute a true complication. It may result in marasmus, or be so severe, lasting into the intervals, as to cause collapse. Complications on the part of the nervous system are rare. Occasionally a paroxysm is followed by strabismus, dilatation of pupils, or blindness.

Diagnosis.—Whooping cough, as already stated, occurs in paroxysms or explosions. The series of expiratory coughs, terminating in an audible inspiration and the expulsion of phlegm and mucus from the mouth; the anxiety shown by the patient whenever a paroxysm is impending; the puffy eyelids; the sallow, pallid countenance; the tendency of the cough to group itself into paroxysms; the aggravation of the cough at night and by eating any dry food; the attendant tendency to vomit with the cough—when these symptoms or many of them are present, there is no difficulty in establishing the diagnosis.

During the first stage, if the history of exposure be obscure, the diagnosis is often in doubt, and in mild cases must remain so until the characteristic whoop is developed. Even now there are grounds for confusion. It is allowed by all writers that chronic diseases of the bronchial glands sometimes produce a noisy, paroxysmal cough, very like pertussis. But in such cases there is an absence of any definite stages and they

occur sporadically, not in epidemics. There is evidence of associated lung disease, and a history of wasting, long before the development of the cough.

Prognosis.—The prognosis in whooping cough depends somewhat upon age and constitution, but more upon treatment and management. It seems strange to read in the works of late authors that this affection has ever had so large a mortality as is therein mentioned. Thus, it is stated by Dr. Whittaker that out of 500,341 deaths occurring in England in one year, 10,318 deaths were from whooping cough. Again, he states that in one decade in New York, wherein 4,062 deaths occurred from typhoid fever, there were 4,094 deaths from this disease. In this city (Chicago), during 1892 there were 1,489 deaths from typhoid fever and 164 deaths from whooping cough. This year, however, is not a fair criterion by which to judge of the relative mortality from the two diseases. Typhoid was very prevalent and unusually fatal, while whooping cough was mild in its attacks and not very prevalent.

That it is not a trifling ailment is shown by the relative mortality from it, as compared with scarlet fever and measles. The mortality from the three diseases was (1892) as follows: Scarlet fever, 382; measles, 185; whooping cough, 164. Under homeopathic treatment, this disease usually runs a mild, although sometimes tedious, course, and its complications and sequelæ are neither common nor severe. This is especially true if the cases affected with some dyscrasia, be eliminated from our statistics.

The greatest mortality is always in young infants. In children of four or five years of age, the mortality is small. Biermer made a grand average of the established mortality rate, based upon the statistics of many authors, at 7.6 per cent.

The most frequent causes of death are suffocation due to spasm of the glottis, broncho-pneumonia, hemorrhages and marasmus. The more numerous the seizures in the twenty-four hours, the more grave is the disease. When they reach as high as fifty or sixty paroxysms in a day, the disease assumes a special gravity.

Treatment.—There is no remedy in our own or any other school of practice which acts as a prophylactic in whooping cough. Nor is there any remedy that can properly be regarded as a specific in the affection. The treatment to be successful must be symptomatic, and regard must be had for the *genius epidemicus*. In some epidemics a remedy may frequently be found that will abort some cases, abbreviate others, and ameliorate all. Thus, Dr. Winterburn states that in a widespread epidemic, occurring in Brooklyn some years ago, he used

gelsemium almost exclusively, and with the most satisfactory results.

This drug is a prince among nervous and especially spasmodic affections, and ought, *à priori*, to be a useful remedy in the spasmodic stage of the disease at all times; and yet we have failed to find it mentioned in connection with whooping cough by any author whom we have consulted. Dr. W. A. Edmonds, of St. Louis, in his "Treatise on Diseases of Children," says that in the early years of his practice he achieved considerable local reputation by using *belladonna* and *drosera*, either simultaneously or in combination. He says: "The form of combination was to medicate pellets No. 25 with 1st decimal dilutions of the two named remedies, and prescribe two to four, six, or eight pellets, according to the age of the child, at intervals of about two hours at first, and when better every three or four hours. . . . This prescription," he further states, "I have found remarkably successful in the treatment of whooping cough. Sometimes it has seemed to cut it short; it rarely fails to induce a most comfortable palliation."

We have, ourselves, used, with great satisfaction, a similar combination of *ipecac* and *hyoscyamus*, and we feel sure that we have many times aborted an attack of whooping cough by their combined use in the manner above indicated. Probably a more scientific and perhaps more successful method would be to give the belladonna or the hyoscyamus in the febrile or catarrhal stage, and the drosera or ipecac afterwards. The use of remedies during a paroxysm is out of the question. Whatever therapeutic measures are adopted, they must be brought into use during the intervals, and must be used persistently and patiently in order to test their utility. In addition to the remedies to be considered hereafter, according to their symptomatology, various inhalents have been used, and apparently with some degree of success. Among the more prominent of these are turpentine, thymol, carbolic acid, cocaine, tar, benzole, sulphuretted hydrogen, and illuminating gas (carburetted hydrogen). Vapo-cresolene, which is one of the products of coal-tar, has considerable repute, and we have sometimes thought that it did ameliorate the paroxysms; but we have been unable to discover any permanent good from any of these volatile remedies. On the other hand, they are open to serious objections—at least, many of them are—because they fill the air with pungent fumes, that make it almost intolerable for the attendants, and must of necessity vitiate the air breathed by the patient.

In lack of indubitable evidence of merit in the use of such malodorous compounds, it is better to give the child plenty of

fresh air to breathe, and trust the rest to nature and remedies internally administered.

Therapeutics.—In addition to the drugs already mentioned, there is a long list of remedies whose homeopathicity to certain phases of the disease is vouched for by unquestionable authority. Raue, in his "Special Pathology and Therapeutic Hints," gives the symptomatology of over seventy drugs. Lilienthal contents himself with thirty-four. We shall limit ourselves to a half-dozen or so of the principal remedies, which have received personal verification of their therapeutic value.

As regards the complications and their treatment the reader is referred to the special chapter or section bearing upon the disorders, regardless of their origin. There is no special reason why bronchitis, broncho-pneumonia, or convulsions should be treated differently when arising in the course of whooping cough than if they arose idiopathically, and we thus avoid needless repetition.

Belladonna.—Cough so spasmodic that patient cries; great congestion of head and face, which causes considerable coryza and epistaxis; short, rough, hollow cough, caused by tickling sensation in larynx; dry, spasmodic cough, worse at night; touching the throat or moving it excites the cough; the breathing is short, hurried and labored; dyspnea; involuntary passage of stools.

Corallium Rubrum.—Paroxysms of convulsive coughing; cough excited by deep inspiration; rapid succession of violent paroxysms of coughing, so violent that child stops breathing, grows purple in the face, and becomes exhausted; followed by vomiting of large quantities of thick, tough mucus; paroxysms increase in frequency towards evening.

Cuprum Met.—Most useful action is in the spasmodic stage; face and lips dark blue, almost black; expectoration of blood-tinged, putrid mucus, especially in morning; cough caused by mucus in the trachea; cough occurs in paroxysms which are violent and long lasting; paroxysms so long that child loses its breath, and is thrown into convulsions with purple or black face; cough aggravated by eating solid food, but liquids ameliorate the paroxysms.

Drosera—The paroxysms of coughing follow each other so quickly that child cannot get his breath; cough causes a feeling of constriction in the chest, which is relieved by pressing on the stomach; cough is worse after midnight and is followed by retching and vomiting, and cold clammy perspiration; epistaxis frequently follows the paroxysms of coughing.

Gelsemium—Paroxysms of hoarseness and coughing from tickling and dry roughness of the fauces; severe, convulsive,

spasmodic cough; soreness of the chest when coughing; heavy and labored respirations; expirations sudden and forcible.—*E. M. Hale.*

Hyoscyamus.—Constriction in throat causing difficult swallowing, especially of liquids; great thirst, but drinks little at a time; at night the cough is dry and spasmodic, aggravated by lying down, and better when sitting up; face dark red, bloated and distorted.

Ipecac.—Aversion to food of all kinds, with vomiting of food and some bile; peevish and irritable, with face dark and anxious looking; urine scanty and bloody; breathing difficult, with rattling in chest and expectoration of bloody mucus; cough brings on a vomiting spell, with difficult breathing and epistaxis of bright-red blood; cough worse at night, with copious hemorrhages from nose and mouth; dyspnea; face blue and body rigid.

Stipp, of Nuremburg, has recently introduced to the therapy of the old school a new remedy, which is by many believed to be almost a specific for this disease. It is *bromoform.* It is used safely, so it is said, in doses of from one to five drops, according to age, repeated three or four times daily. In large doses it has produced narcosis. In Senator's polyclinic one hundred cases were treated by Lilienthal, who claims that it rendered the cases milder in the course of a few days. A New York physician, who treated fifty-one cases with it, claimed that it surpassed all other remedies in its curative properties. The duration of the treatment was from ten to thirty days; and cure occurred in 75 per cent. of the cases in from two to three weeks, "if there were no complications."

Hygienic Treatment.—A child with whooping cough should be kept indoors in inclement weather, and allowed proper freedom to enjoy the fresh air in mild and suitable weather. The clothing should be of woolen; the diet should be of the most wholesome and concentrated character consistent with good digestion. It must not be forgotten that much aliment is lost through vomiting in bad cases, and marasmus is one of the formidable sequelæ. Meat broths, milk, and eggs—the latter, of course, in older children—are the best articles of diet. In slow convalescence, change of climate often works wonders. The temperature of the house or the rooms of a whooping-cough patient may be kept warmer than would be advisable in most other affections; 70° or 72° is none too warm, but a uniform temperature in this disease is very desirable.

CHAPTER III.

PAROTIDITIS (PAROTITIS; MUMPS).

Definition.—Mumps is an acute and painful inflammation of the parotid glands. It is contagious, but not infectious. It is of brief duration, and but little gravity, except as it involves other and remote organs. It is inclined to be epidemic. A similar, although probably not identical, inflammation of the parotids, is of frequent occurrence in the course of typhus, typhoid and septic fevers; but in the latter cases suppuration of the glands is apt to supervene, which is not true of mumps proper. It is very prone to precede or follow outbreaks of the exanthemata, and there is rarely an epidemic of any of the diseases of childhood, without some cases of mumps. It is mentioned by all of the older medical writers, and is, without doubt, a disease of great antiquity. It is most prevalent in the first quarter of the year, and affects males more frequently than females.

The two extremes of life are practically exempt. The period showing the greatest susceptibility is from two to ten years. It is very apt to prevail epidemically where a considerable number of people are herded together. Thus, boarding-schools, jails, orphan asylums, and especially barracks, are often invaded, and when this is the case it is pretty sure to affect all who have not had it previously. One attack, if bilateral, affords security from further infection. The disease sometimes attacks the lower animals, especially dogs; and it is possible that it may be by them communicated back to man, and the spread of the contagium be thus promoted. Poore declares that "a boy aged seventeen, affected with mumps, and five days later with inflammation of the testicle, which suffered atrophy, communicated the disease to a dog, his constant companion and bedfellow. The dog began to show symptoms in fourteen days exactly like those of his master, including subsequent involvement of the testicles, which likewise suffered atrophy. Thenceforth the dog took no pleasure in the society of other dogs, which he seemed to shun, and in his disgust forsook his old master for a new one."*

Pure mumps has no definite lesion and no morbid anatomy,

* Pepper's "Text Book," p. 305.

except a transient hyperemia, which subsides during resolution, leaving no trace behind. It is liable, however, to affect neighboring glands, and the connective tissue between and around them. The total duration of parotiditis is, in mild cases, from five to seven days, and in others it may last double this length of time. Rarely, but sometimes, the tonsils are also tumefied.

Symptoms.—Ordinary mumps has no premonitory or prodromal stage. It commences with tenderness in the parotid region, followed soon after by tumefaction, which gradually increases until it fills the depression under the ear and extends forward and upward into the cheek, and downward to a greater or less extent upon the neck. As a rule the color of the skin is unaltered, but occasionally there may be some redness over the parotid. There is a dull, aching pain whenever the masticatory muscles are used; hence, anything which excites an unusual flow of saliva, like acids, is attended by increased discomfort. The disease is attended with considerable malaise rather than downright illness. In many cases the temperature remains normal although it sometimes rises as high as 102° or even higher.

The swelling reaches its maximum from the third to the sixth day. At this time, the most prominent point is immediately under the lobe of the ear which it presses upward and outward. The tumor which is formed is firm, but elastic, and has a doughy feel, very different from the hard and unyielding character of an induration.

Not only is mastication painful when the disease is at its height but talking is attended with difficulty, causing the patient to *mumble*. This is supposed to have given origin to the name under which the affection is most commonly known.

In most cases parotiditis is double; it commences on one side, more often the left than right, and in from one to four days the opposite gland is involved. In those exceptional cases in which only one gland is affected, the opposite one may be the seat of the disease at some subsequent period. The proportion of cases in which only one parotid is affected, as compared with those in which both are involved, is stated to be as one to ten.

Occasionally in double mumps, the swelling is so great as to extend from one side to the other in a huge, continuous double chin.

Complications.—The chief danger in mumps arises from the fact that the swelling of the parotids sometimes abates suddenly, and coincidently, in the male, the testicle, epididymis and tunica vaginalis become inflamed; while in the female, the mammary glands, ovaries, or the labia majora are the seat of

the so-called metastasis. These metastatic inflammations are more common about the age of puberty than they are either earlier or later. Occasionally they occur without the usual subsidence of the parotid swelling. The period when this complication is most likely to arise is uncertain. Dr. Dake records twelve cases in which the orchitis began on the seventh day in six cases; on the eighth day in four, and one each on the ninth and first.

The orchitis usually subsides within a few days, but in exceptional cases it may lead to persistent hydrocele and atrophy of the testis. Whenever the disease is thus complicated there is a sudden rise in the temperature, and usually rigors are present. The constitutional disturbance may be severe, and the high fever may be attended with delirium.

Meningitis is another complication which is said to occur in the course of mumps, but it must be very rare, as most writers do not mention it. We have never seen it in this connection.

Diagnosis.—The only affection with which parotiditis is likely to be confused is that symptomatic inflammation of the glands which is liable to occur in diphtheria, scarlet fever, or some other of the essential fevers. But in the latter case the swelling is hard like cartilage; is circumscribed, and does not invest the ear; the swelling is red instead of waxy, and there is a manifest tendency to suppuration, which is not the case in true mumps. It should be remembered, however, that essential mumps may involve the submaxillary or even the cervical lymphatic glands and leave the parotids untouched. While such cases are exceedingly rare, it is well to bear the fact in mind, in order not to make a mistake.

Treatment.—In ordinary cases the treatment is exceedingly simple and consists principally in hygienic meaures, which may conduce to the comfort of the patient, and the avoidance of cold, which might tend to complications. The diet should conform to the patient's inability to masticate, and consist of broths, milk or other easily digested liquids or semi-solids. Soothing embrocations may be made to the swollen glands, to alleviate the pain and tenderness of the parts. Nothing should be used, however, of a repellant character, nor should the neck be swathed too warmly with either wool or cotton. In case there is considerable fever *aconite* or *belladonna* will be serviceable; and in case of orchitis, the recumbent posture must be observed. *Mercurius* should be given if the glands show any tendency to permanent enlargement, or *aurum muriaticum.*

The patient should remain indoors until all swelling has subsided, and if the testicle has been involved he should wear a suspensory bandage for some weeks after apparent recovery.

PART VII.

AFFECTIONS OF THE HEART.

CHAPTER I.

POSITION, ANATOMY, AND FETAL CIRCULATION.

Position.—The heart in a child occupies a position somewhat higher in the thorax than that of an adult. The auricles are on a line with the second intercostal space, the right extending beneath the sternum and almost to its right border. The right ventricle is beneath the sternum and to its left; its lower border is on a line with the head of the sixth costal cartilage. The left ventricle lies between the third and fourth intercostal spaces, and beneath the fourth rib. The position of the apex-beat differs from that of the adult. The apex is much higher and nearer the nipple, and in some cases the nipple pulsates synchronously with the apex-beat. This higher position of the apex-beat may be due partly to the distention of the stomach, and the large size of the liver at this period of life. The apex-beat descends in position as the child grows older. In children of six years it is generally close to the nipple, while at the age of twelve it is an inch or more lower. The base of the heart is usually found posteriorly at the fifth dorsal vertebra. The anterior surface of the heart is removed from the chest wall by the lungs. They cover almost all of it except the extreme point; the tip of the left ventricle and the lower part of the right ventricle only are accessible for physical diagnosis. The accessible portion forms a triangle having three points, namely: (1) the apex-beat just below the nipple; (2) the junction of the sternum with the ziphoid cartilage; (3) the junction of the left costal cartilage with the sternum. All the four valvular openings in the heart of a child lie in close proximity within a space half an inch square. The mitral valve will usually be found at the left border of the sternum, on a level with the upper border of the third costal cartilage. The tricuspid lies more under the sternum, slightly in front and a little lower. The valves of the pulmonary artery are found opposite the lower margin of the

second interspace. The aortic opening is slightly lower in an oblique direction. For a definition and description of the normal sounds of the heart, the reader is referred to the classical text-books.

The study of a case of suspected disease of the heart in a child is beset with difficulties not met with in an adult.

Method of Study.—If you commence to examine immediately after the child is prepared by removing the clothing, the sight of the instruments will stir up the circulation to such an extent that you cannot make a correct diagnosis. While the child is being quieted and growing accustomed to your presence, inquire into the previous history. Has your patient had scarlatina, measles, rheumatism, or any diseases with a known tendency to cause endo- or pericarditis? Observe the appearance of the skin, if there is a normal capillary circulation, especially about the face and finger-nails; the expression of the face; the presence of dropsy or anasarca; the condition of the respiration; the presence of cough; the appearance of the alæ nasi and the color of the mucous surfaces. First, notice by inspection if the apex-beat is a normal position. By palpation with the tips of the fingers observe the apex-beat. It should be limited in area, well defined and punctated. It should give evidence of a first and second sound; the former by a dull, long vibration, the latter by a short and distinct impulse against your finger tips.

Percussion of the heart of a child, unless it is soporose or very docile, is very difficult, requiring great skill and tact. The patient should sit upright; commence at the middle of the left clavicle and proceed downward until a dull sound tells you the upper border of the heart is reached. Then percuss from the right side of the sternum on a level with the fourth rib, directly across the bone, until at about its left edge you find the dullness which shows the heart is reached. In both cases continue across the area of dullness until a clear note is heard, showing the lung is reached.

You will find, however, percussion so unsatisfactory that you will learn to rely almost wholly on auscultation as a means of diagnosis. The two best stethescopes are Soule's, and Edwards'. The rubber vacuum cup of the former adheres and does not need to be pressed against the skin, a process decidedly objected to by children. Edwards' bin-aural is very light and is the best of the kind.

Place the child in an upright position. Apply the stethescope closely to the bare skin. The auscultator's head should not be too low, this is very essential. You will then detect two sounds very different in character. The so-called first sound is low,

dull, booming and seems close to the ear; the second sound is short, abrupt, winging or flopping. These two sounds in children are audible over the entire region of the heart, and in fact all over the thorax, but the sounds are heard most distinctly over the seat of their production.

Full inspiration lessens the sounds very materially; full expirations increase the extent over which they may be heard. Note whether the sounds are obscure or clear, the periods of pause, or any change in rhythm. Remember that the normal heart of a child may beat irregularly or intermittently; but that such arythma is always suspicious. If the heart is not diseased, it may be the brain or liver, or may arise from some intestinal disorder.

The Fetal Circulation.—Owing to certain differences which exist between the fetal and adult heart, the circulation of the blood in the fetus *in utero* differs from that of the child after birth. This fetal circulation should be understood and studied, or you will not be able to appreciate congenital diseases and malformations of the heart.

"The following is a brief, but yet explicit, résumé of the fetal circulation: Blood is conveyed through the umbilical arteries, which are terminations or branches of iliac arteries, to the placenta, where, within the villi of the chorion, the interchanges with the maternal blood take place. After being thus renovated and recharged with oxygen, it collects within the umbilical vein from innumerable branches, and passes back through the umbilical cord to the liver. The blood thus returned to the fetus is arterial, and that which passed through the umbilical arteries, venous; but it is so in a modified sense only. After reaching the liver, on its return from the placenta, a part of it first circulates through the liver, and then passes out through the hepatic veins, while the rest goes through the ductus venosus into the inferior vena cava, and both of these streams uniting in this vessel, continue on to the right auricle. The two columns of blood, that is, the blood passing into the vena cava from the hepatic vein and from the ductus, join the stream which has been collected from the lower part of the body, and mix with it. In early fetal life the inferior vena cava opens at the septum of the auricles into both cavities, though the chief part of the blood enters the left, owing to the increased development of the eustachian valve. Subsequently this valve becomes smaller, and by the increased development of the valve guarding the foramen ovale, the current is turned more and more into the right auricle. In this cavity the blood is partly mixed with that which enters from the superior vena cava, and a part of it descends into the right ventricle, whence it passes, in part,

through the pulmonary artery into the lung tissue. No proper pulmonary circulation having yet been established, only about half the blood contained in the right ventricle enters the pulmonary artery, while the other half enters the descending aorta through the ductus arteriosus. The imperfectly developed pulmonary veins convey to the left auricle but a small quantity of blood, the chief supply being received from the right auricle through the foramen ovale, through which passes the main stream from the inferior cava. From the left auricle the blood, which is semi-arterial, descends into the left ventricle, and thence into the first division of the aorta. By virtue of this movement the head and upper extremities are supplied, through the carotid and subclavian arteries, with the blood which has been but little deteriorated in quality, and escapes the more venous current from the right ventricle through the ductus arteriosus."—*Leavitt's Obstetrics.*

"The establishment of independent circulation takes place as soon as the child is born. The first act of the new-born babe is a lusty cry which inflates the lungs, and, in consequence, dilates the pulmonary arteries. As a sequence, the greater part of the blood in the right ventricle is at once distributed to the lungs, where it becomes changed from venous to arterial blood, and is returned through the pulmonary veins to the left auricle. The left auricle now receives more blood than it has been accustomed to, the right less, and, owing to arrest of the placental circulation, the umbilical veins are inactive. We now find that the pressure of the blood in the two auricles is equalized, which aids in the closure of the foramen ovale.

"The blood no longer finds its way from right to left auricle, but into the right ventricle, and thence to the pulmonary artery. The ductus arteriosus becomes impervious, and soon collapses. The blood in the descending aorta does not find its way into the hypogastric arteries, but directly into the lower extremities, and adult circulation is established."—*Keating on the Hearts of Children.*

CHAPTER II.

CONGENITAL DISEASES OF THE HEART.

"AFTER birth the foramen ovale soon becomes permanently closed, probably by contracting adhesions to the edges of the aperture. The umbilical arteries and veins and the ductus venosus speedily collapse and become impervious. Any one of these structures may remain pervious and constitute some of the circulatory anomalies due to arrested development or want of proper completion in the stages of change from fetal to adult circulation. The foramen ovale sometimes remains open or imperfectly closed. Some observers state that the valve is never completely obliterated until the eighteenth month or second year of extra-uterine life. In many cases, the patulous foramen is secondary to defects in the mitral valve, allowing regurgitation or obstruction in the large arterial trunks, aorta, and pulmonary artery. A patulous foramen is more frequently associated with obstruction or narrowing of the pulmonary artery. Narrowing of the tricuspid orifice would also be a direct cause of patulous foramen ovale, but primary defects in the tricuspid orifice, causing narrowing or stenosis, are very rare; in fact, it is rare that we see it even in combination with other defects. It may be, and generally is, due to narrowing of the pulmonary artery. As a rule, the direction of the blood-current, in cases of patulous foramen ovale, is the same as that during fetal life, *i. e.*, from right to left auricle; but cases have been noted in which the direction of the blood-current was directly opposite from that which pertains during intra-uterine life, *i. e.*, from left to right."—*Keating and Edwards.*

I shall not mention other malformations, as they are not amenable to treatment, and cannot be included in a work of this scope. For a study of those the reader is referred to that admirable treatise on "Diseases of the Heart in Children," by Keating and Edwards.

The *symptoms* of these congenital defects should be studied in order to make a diagnosis. Many children, at birth, present an intensely blue discoloration, which more or less speedily passes away, depending upon the voluntary or artificial estab-

lishment of respiration, whereby the circulatory organs are rendered active. If the discoloration continues, some congenital malformation of the heart or great vessels should be suspected. So, also, if a child, a few weeks after birth, develop cyanosis; it is almost positive proof of some congenital defect. If due to that cause a murmur may be heard, together with quickened pulse and rapid heart action. If the defect is compatible with life, the patient may live several years, and even pass through youth to manhood. Keating mentions the case of a girl who remained in bed until sixteen years old. I have known several men, aged respectively eighteen, twenty-four and thirty, whose foramen ovale never closed. They were slim and poorly nourished, and never became capable of much physical exertion. Cyanosis may not always be present. Dyspnea on exertion is always present. The temperature is often sub-normal, especially when the patient nears dissolution. Cough is almost always present. There may be chronic bronchitis with bloody expectoration. The subjects are prone to congestion of the spleen, liver and kidneys, and to dropsy with albuminuria. The fingers may be clubbed, nails bent, or ulcerated around the margin.

Treatment.—We can do but little in the treatment of congenital defects. The main aim is to keep up the integrity of the cavities of the heart, just as we should in cases of threatened hypertrophy with dilatation in adult life. The chief medicines are cactus, digitalis, nux vomica, and phosphate of lime. Rest, both of body and mind, is imperative, when we fear imperfect compensation. The child should be fed (if not nursing) on good, nutritious, muscle-making food. The position, when lying, should be on the back or right side. A warm, dry or moist climate is preferable. I sent two patients to South Florida, who lived there comfortably when they could not live so in the North.

CYANOSIS.

This is sometimes called the "blue disease." It is one of the most constant and prominent symptoms of congenital heart disease. It may, however, be acquired, and be caused by endo or pericardial inflammation; it may be present in hydropericardium, or any active pericardial effusion. Dr. Waters (*Phil. Med. Examiner*, 1850) relates a case in which cyanosis developed in a child aged six during an attack of measles, and remained persistent. Another case is reported in which a six-months babe received a severe fall, and was cyanotic always

afterwards. Many other such cases are on record. Cyanosis may be caused by a stasis in the venous current independently to a certain extent of the admixture of venous and arterial blood, but if the latter occurs the color will be a great deal darker. It is a strange fact, however, that there may be a complete mixture of the blood without any cyanosis whatever. Any cause which prevents a return of venous blood to the heart, or its proper oxygenization in the lungs, will cause cyanosis. All the cardiac poisons which paralyze the heart will cause a degree of cyanosis. J. Lewis Smith ("Diseases of Children") says cyanosis is more common in male than in female children. He also says that large cities return the largest proportion of cyanotic cases. It is found principally among the lower classes, who have a perpetual struggle for existence, living in low, damp, ill-ventilated rooms, with scanty food and clothing, and with wretched hygienic surroundings. Such conditions inevitably result in imperfect, or arrested development of children, even in the uterus.

Cyanosis due to congenital defects may not appear at birth. Smith gives 41 cases; in 3 it appeared in two weeks, 1 at three weeks, 2 at one month, 7 from one to two months, 5 from six to twelve months, 3 from one to two years, 1 from five to ten years, 6 from ten to twenty years, 1 from twenty to forty years, and 1 over forty years. This shows that a congenitally crippled heart may, in some cases, carry on life many years, conforming itself to a disordered blood circulation, and continue to grow in strength until some accident or disease "breaks the compensation."

Treatment.—After cyanosis once appears and is due to a structural cardiac defect, a cure is very rare, but considerable improvement may occur. Rest, good nourishment, avoidance of all excitement, bodily or mental, with a warm climate or warm clothing, must be insisted on. The medicines which cause venous stasis with imperfect oxygenization of blood—or, to be more exact, which cause cyanosis primarily—as laurocerasus, hydrocyanic acid, cyanuret of potash, etc., are not indicated in this disease. Only those are useful which, by their action on the muscular fibers of the heart, tend to prevent dilatation of its cavities. The most prominent of them are digitalis, cactus, strophanthus, anhalonium, spigelia, spongia, convallaria, coffea, etc., given in doses suitable to the age of the child. If the blood is actually impoverished, ferrum and manganese, with ignatia and nux vomica, should be given, and those meats which are rich in blood-making material. Constipation or hepatic torpor must not be allowed to exist, as improvement will be greatly retarded thereby.

VALVULAR DISEASES.

Valvular lesions in children are usually caused by rheumatic endocarditis. More rarely are they caused by, or occur during the progress of, Bright's disease. As before stated, they may be congenital. They occur during chorea, and it is still a disputed question whether chorea is altogether of rheumatic origin or often caused by a specific bacilli. If the latter, we need not be surprised to find that they invade the valves of the heart.

The diagnosis of valvular disease of the heart in children is governed by the same rules as for the adult, with the exception that the position of the heart in health and disease is higher in the thorax in children. This I have mentioned on previous pages. In vol. 2 of "The London Homeopathic Hospital Reports," 1892, is an excellent paper by Dr. E. A. Neatby, assistant physician, containing "original investigations respecting the position of the heart's apex-beat in children." The following summary of the conclusions were based on two hundred measurements in cases where no deformity of the chest was present, and no disease of the heart or lungs. The age limit was fourteen years.

"1. That the heart's apex-beat is situated more externally in children than in adults.

2. That it is quite exceptional, if not abnormal, for it to be found external to the nipple line.

3. That the relative distance of the apex-beat from the nipple line varies rather with the age of the subject than with the size of the thorax.

4. That the more external position in children is explained by the large size of the heart and by the small transverse measurement of the chest in these subjects.

5. That the size and state of distention of the abdominal organs furnish a less constant cause for variation of the position of the heart.

6. That the heart is situated also at a higher level in the thorax than in adults, and that this is especially the case in infants.

7. That the apex-beat is felt at a higher level in the recumbent than in the erect posture.

8. That the heart's sounds are more widely audible in the chest of the child than of the adult.

The most direct method of diagnosis of valvular disease is by auscultation.

Most valvular murmurs are due to a change at the valvular orifice; either a narrowing or stenosis, or an insufficiency with an inability to close the aperture, permitting regurgitation. The possible valvular murmurs in the heart (exclusive of

congenital effects) are caused by obstruction or regurgitation of mitral, tricuspid, aortic and pulmonary valves. Thus we may have two murmurs to each valve, or eight in all. Some of them are so rare that the general practitioner is likely to overlook them. If the heart-beats are very rapid, we may not be able to hear the murmurs as distinct sounds. They have all a common quality, they are all *blowing;* yet the sound itself may present all variations in the musical scale. The various names given to these sounds as sawing, cooing, etc., have but little practical value, as they teach us nothing as to the real source of the sound.

These murmurs are not always heard with equal distinctness; change of position may cause them to disappear or to become very faint. Exercise or undue pressure of the stothescope will cause abnormal sounds to become louder. A murmur may be absent when the child is in absolute rest. It is very difficult to decide whether the murmur occurs during the systole or diastole. It is asserted that a sound which occurs synchronously with the apex-beat is systolic, no matter what its characteristics are.

Having discovered the existence of a murmur in the heart we must next definitely locate its seat and character—whether it is an obstruction or a regurgitation. The fact that a sound has its maximum intensity near the seat of production, the closer we approach this seat the louder will the murmur become. The cut (page 392) from DaCosta shows us where the various valves are located, and it will aid in identifying the locality of the murmur.

The scope of this work will not permit complete directions for auscultation in the various valvular diseases of the heart. Reference must be had to special works on diseases of the heart. (Keating & Edwards; Hale; Clapp on "Auscultation and Percussion.")

"After we have found a mitral stenosis, or insufficiency, our diagnosis is not complete until we have recognized the general and local changes consequent on their presence. In both, the chambers of the heart speedily become deranged, some by dilatation, and others by hypertrophy, or by a combination of both. The left ventricle is usually found in a condition of hypertrophy, as it receives the blood under high pressure from the pulmonary veins, and furthermore, it performs all its functions under high pressure also. The left auricle is always dilated, and the right ventricle hypertrophied. The early alteration in the heart cavities is not manifested by any disagreeable symptoms in the patient until the compensation is deranged, and the cardiac equilibrium is interfered with. Then symptoms

such as palpitation, cougn, snortness of breath, and dropsy appear.

"*Tricuspid Disease.*—Primary disease of the tricuspid valve is very unusual, except those cases of pre-natal origin. It less rarely occurs secondarily dependent on mitral disease which has weakened the right heart.

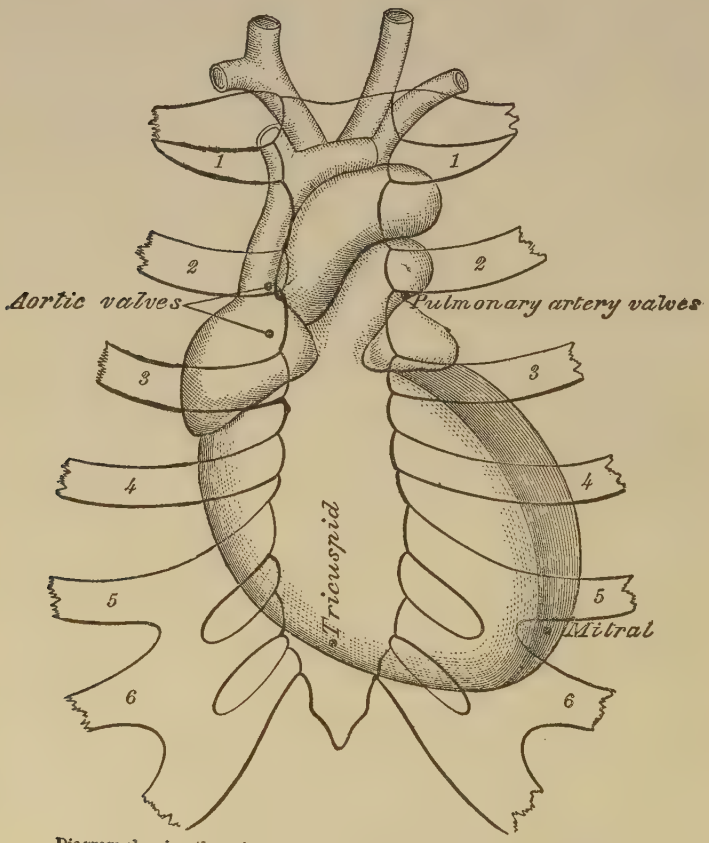

Diagram showing the points at which the separate valves may be listened to.

"Stenosis is more rare than incompetency—so rare that it is hardly worth while to consider it.

"Insufficiency causes many serious symptoms; the first effect is to cause the right auricle to become dilated and hypertrophied; then the right ventricle, which soon encroaches upon the left heart. The portal system becomes congested, the liver

enlarged, and hemorrhoids may arise. The urine becomes scanty and even suppressed. Edema and anasarca arise rather later than in other valvular diseases.

"*Aortic insufficiency*, arising primarily in infants, is among the uncommon clinical observations, excluding cases having congenital origin; in older children it is not at all rare. The etiology of aortic insufficiency is much the same as we have already considered in treating of the general subject of valvular disease. At this valve, however, we are more likely to have an insufficiency suddenly produced during sudden exertion from the rupture of a segment of the valve, occurring usually at the free border; sometimes, however, at the insertion of a leaflet. It is difficult to believe that a healthy valve would rupture under these circumstances, and we must admit the existence of a previous valvular disease, which has weakened its structure.

"*Symptoms and Physical Signs.*—Of all the cardiac diseases, this is certainly the most easily recognized, both on account of its characteristic general symptoms and the acuteness with which the physical signs are defined. Corrigan first recognized this fact by describing the 'visible pulse,' so marked in this disease. The pulse is sudden and bounding, giving an impression of seeming strength; but it is elevated suddenly, and falls immediately. In the words of Corrigan, 'The arterial trunks of the head, neck, and upper limbs at once attract the eye by their peculiar pulsations; at each diastole the subclavian, carotid, temporal, humeral, and sometimes even the palmar arteries are projected forcibly from their bed and bound under the skin.' In order to better observe these points, we are in the habit of having the patient strip one arm, and preferably one side of the chest, separating the arm from the body, semi-flexing and supinating the forearm; the observer, at a glance, will be able to note the entire course of the arteries under consideration. Corrigan's original explanation, which has stood the test of years, cannot be improved upon: 'When the semi-lunar valves are healthy, they are closed by the pressure of blood immediately after each ventricular contraction. When the occlusion is complete, the blood propelled from the ventricle is retained in the aorta, and the large vessels remain distended. These vessels then maintain almost the same caliber in systole as in diastole. But when the valves no longer close the aortic orifice, a certain amount of blood contained in them is allowed to escape; they become flaccid after each ventricular contraction, and their diameter diminishes. At this moment a fresh contraction of the ventricle rapidly forces into the vessels a quantity of blood, which dilates them forcibly and suddenly. The arterial diastole is then marked by such a sudden increase in the caliber of

the vessel that it produces a visible pulsation, constituting one of the signs of the disease.' The murmur is heard at the second right costal cartilage, 'the aortic cartilage;' it is heard as high as the upper border of the second intercostal space, also slightly to the right of the sternum, and descending downwards throughout the extent of the bone, inclining a little to the left as the ensiform cartilage is approached. Aortic insufficiency is accompanied by a murmur, which is diastolic in time, replacing the click of the semi-lunar valves and commencing with cardiac diastole, consequently occupying the greater portion of the period of silence; it terminates with the diastole, or better—the murmur is cut short by the next systole. The systole will be found to be shorter than normal, with a rapid subsidence. As the heart becomes hypertrophied, the murmur becomes more distinct and presents greater areas of transmission.

"The general symptoms in young patients are apt to be latent for a long time, and the sole manifestations are the physical signs. Later, hypertrophy of the left ventricle arises and the apex becomes lower than normal, producing an epigastric impulse, and displacing the left lobe of the liver downwards. As the case advances, the cardiac chambers become dilated; it is then that we note an increase in the vertical diameter of the heart; the tricuspid may become insufficient by a process of simple dilatation of the orifice.

"The patient, if perfectly quiet, will be in comparative comfort, but the slightest exertion will produce palpitation and distress, with a feeling of anxiety and oppression. Dyspnea becomes an exacting symptom, which muscular exercise or mental worry will increase to apnea; it is the duty of the physician in these cases to warn the parents or guardian of the necessity of correcting the child in a mild manner, and to especially caution them against the danger of violent whipping or secluding the child in a lonely or dark room. Parents should see that these children are not unduly excited by their nurses reciting 'ghost stories,' or tales of reckless daring, culled from the unfortunately prevalent poor literature of the day. Among the most alarming cases that we have been called upon to treat have been examples of 'night horror' in young children with valvular diseases, whom a nurse or elder brother or sister has conned to sleep by some story gleaned from the cheap weekly papers scattered so broadcast throughout the country.

"Occasional attacks of angina pectoris may arise, alarming the patient greatly, and introducing a new and serious element in the prognosis. The natural course of the disease in the young is slow; when dilated hypertrophy arises, we then note

the symptoms of venous tension, congestion of the portal and pulmonary veins, with edema of the extremities."*

Treatment.—The treatment of valvular disease of the heart, especially in children, is not altogether medicinal. Without proper hygienic measures, drugs can do but little to assist the heart to overcome the lesions of its valves. Aided by a regulated life of the patient, the *vis medicatrix naturæ* must do all the rest. The cure, or a condition approaching it, is brought about by a process which is called *compensation.* It would be in vain for me to attempt to describe this process in my own words as clearly as it is described by Bramwell in his great work on the "Heart and its Diseases," and I shall therefore take the liberty of quoting from that author. He says:

"It might be supposed that every structural alteration which produces either stenosis or incompetence of a valvular orifice, is necessarily attended by symptoms due to disturbance of the circulation; and such, in truth, would be the case, if it were not for the fact, that nature adapts herself to the altered condition of things; and that certain secondary changes are gradually established, by virtue of which the bad effects of derangement of the circulation are resisted, and by means of which the normal balance, so to speak, of the circulation is maintained or reëstablished. There is, in short, in almost all cases of valvular defect, a natural effort to compensate the lesion, the importance of which, in a practical point of view, it is impossible to overestimate.

"The compensatory changes consist of alterations in the heart, the object of which is to restore and maintain the balance of the circulation, and to resist the injurious effects of the lesions on the heart itself, and of certain changes in the peripheral tissues, by means of which the injurious effects of backward pressure and venous stagnation are, to some extent, prevented."

The exact nature of these compensatory changes, which depend upon (1) the valve which is affected, and (2) the manner in which it is affected (*i. e.*, whether stenosis or incompetence is the chief lesion), will be more appropriately considered when I come to treat of the individual valvular lesions in detail; but, speaking broadly, I may say that in all lesions compensation is chiefly effected by hypertrophy of the walls of the cardiac cavity or cavities, which are situated behind the affected orifice. Alterations in the frequency of the cardiac contractions also exert an important compensatory influence, more especially, as we shall afterwards see, in the case of aortic lesions. When, for instance, the aortic orifice is contracted, the muscular wall of

* Keating and Edwards.

the left ventricle becomes thicker, and the "driving" power of the left heart being materially increased, a larger quantity of blood is propelled in a given time through the narrowed orifice than could possibly have been the case in the normal (unhypertrophied) condition. So again, stenosis of the mitral valve is followed by hypertrophy of the left auricle, but in this case the normal function of the auricle being passive rather than active, and the resisting power of its walls against the blood pressure depending not only upon muscular tissue, but also upon the connective tissue layers of the endocardium, the hypertrophy consists not only of an increase of the muscular wall of the auricle, but also of thickening of its elastic tissue lining. By these means its resisting power is materially strengthened, at the same time as its propelling power is increased. The reader must not suppose from this statement that all fibroid changes in the cardiac walls add to the resisting power of the organ. When the muscular tissue of the organ is replaced by fibrous tissue, as it is in fibroid degeneration, both the "driving" and resisting power of the organ are diminished. It is only when the muscular wall remains healthy, or is hypertrophied, that an increase of the fibrous tissue in the endocardium can possibly add to its resisting power. This increase of the connective tissue coat of the auricle is (in proportion to the amount of muscular hypertrophy) still more marked in mitral incompetence, in which condition, as we have previously seen, increased resistance is necessary to counteract the dilating force of the regurgitant current, but in which there is no obstruction to the passage of the blood from the auricle to the ventricle. So, again, in aortic regurgitation, the forcible passage of an abnormally large quantity of blood into the cavity of the left ventricle during its diastole (from the aorta through the incompetent valve, and from the left auricle through the mitral orifice), produces over-stimulation of the muscular fiber, in consequence of which hypertrophy of the left ventricle is produced, as we have already seen, by the too forcible distension of the cavity while its walls are flaccid and relaxed.

The hypertrophy, then, which follows and accompanies valvular lesions, is eminently beneficial, though it is not in all cases an unmixed good; and I cannot insist too strongly upon the immense importance of this doctrine of compensation. The symptoms, as we shall afterwards see, are trivial, or altogether absent, so long as the compensatory changes are sufficient to balance the bad effects of the lesion; the prognosis is very largely based upon the amount of compensation and capabilities of repair which are present, while the treatment is in great part directed to promoting and maintaining the hypertro-

phy and other secondary changes, by means of which the balance of the circulation is restored and maintained in a comparatively normal condition.

The amount of compensation which is possible in any given case, depends chiefly upon the following circumstances:

1. *The suddenness, extent and character of the lesion.*

"A very extensive lesion, which occurs suddenly—rupture of the heart, for instance—may, of course, destroy life so rapidly that compensatory changes cannot possibly occur.

" Then, again, a severe (but not immediately fatal) lesion, which occurs suddenly, is with difficulty compensated. Ruptures and ulcerations of valves are examples.

" In other cases, on the contrary, in which the progress of the lesion is slow and gradual, compensation is easily established, and is very complete. In many chronic valvular lesions, for example, compensatory changes advance *pari passu* with the morbid process, and for a time, at least, the balance of the circulation is so satisfactorily maintained, that the patient (provided that he lives a quiet and tranquil life, and does not suddenly add to the difficulties of the circulation) may be unaware of the existence of any cardiac defect.

"2. *The reparative powers of the patient, and especially the capabilities of compensation existing in the heart itself.*

" 3. *The resisting power of the tissues*, which in its turn depends upon the soundness and vitality of the individual organs, and especially upon the vaso-motor nerve tone, and the vitality of the whole organism.

" In young persons, where the tissues are healthy, and in persons of good nerve tone and tranquil disposition, compensation is satisfactorily, and, for a time, at least, effectually established. *Vice versa*, in old people and in persons whose tissues are unsound or degenerating, more especially in those in whom the nerve tone is bad, compensation is, from the first, imperfect, and the injurious effects of the lesion are speedily manifested in the form of symptoms.

" The condition of the tissues, then, as a whole, and the reparative power and vitality of the patient are facts which the practical physician must ever keep prominently in view. Indeed, we lay it down as an axiom, that in looking at cardiac cases, whether from a pathological or a clinical point of view, and more especially in considering the prognosis and treatment, it is quite as important (I might even say that in some it is more important) to look at the condition of the system as a whole, as it is to regard the condition of the heart in particular. He is, in fact, a poor physician who concentrates his attention upon the tissue or organ which is primarily affected; and this state-

ment holds good, even should he succeed in arriving at an accurate estimate of the cardiac or other local lesion; while the best physician is he who accurately gauges the nature and extent of the local lesion, and at the same time takes a broad and comprehensive all-around view of the case."

I cordially subscribe to the excellent advice given by Bramwell in his closing paragraph. If we have a patient—a child or an infant—in whom we have discovered a valvular defect, the first advice to give to the parents or nurse, is to see that the child is kept in a condition of mental and bodily quiet until compensation has fairly set in and the muscular tissue of the heart has gathered strength to overcome the resistance to which it is subjected.

I do not mean that ordinary exercise, in well-ventilated rooms or in the open air, should be forbidden, but that no unusual exertion should be allowed. With children this rule is very hard to carry out, for it is difficult to restrain their exuberant animal spirits. It requires that the watchful eye of an attendant should always be upon them.

The diet should be plain and nourishing; sweet-meats and high seasoned dishes must be withheld, for it is very necessary that the stomach and intestines should be kept in a healthy condition, in order that food should be properly digested and assimilated. I do not believe that a child with valvular disease of the heart should be allowed to go to a public school. If sent to a private school, its studies should be carefully selected, for any cramming or overstudy will bring disaster.

In some respects the kindergarten is objectionable, because the physical exercises in such schools are often severe and exciting. Dancing should be absolutely prohibited until some competent physician decides that compensation has so far advanced that it is permissible. Music or other exciting amusements act upon the heart injuriously. Mental or emotional excitement is as bad for a weak heart as gymnastics or undue physical exertion.

Compensation cannot take place without good blood to feed the tissues of the heart; the blood must be enriched by tissue-making food, and if there is any anemia, ferrum, arsenic, china, calcarea, nux vomica and phosphoric acid should be given. A residence in pure air and the use of mild ferruginous waters, are of the greatest value.

It is possible that we may assist in the resolution of swollen valves by the use of the iodides of lime, arsenic, baryta, aurum, or iron. Of these the iodide of arsenic is the most valuable. I do not advise stimulating the heart muscle, but we can aid compensation by giving the cardiac tonics in restorative doses. We

should administer just enough to aid nature in her efforts, carefully avoiding pathogenetic effects. Small doses of digitalis, cactus, strophanthus, adonis, convallaria, coronilla, spartein, caffein, nux vomica, ignatia, etc., can be given a long time without causing any but good results. We can judge of their good effects by the character of the pulse and the action of the heart. We should change the remedy from time to time, as its effects seem to wear off. When improvement seems at a standstill under one medicine, another will take up the work, and improvement will begin anew.

While the patient is under the influence of physiological cardiac tonics, all influences which tend to weaken the heart, or throw more work upon it than it should bear, must be avoided. Excesses in eating and drinking are injurious, for when the stomach is overloaded, the heart is also overloaded with blood. This, with the pressure of a distended stomach and abdomen, fearfully taxes the strength of a weak heart and prevents compensation. The same occurs when the skin is not in good condition. It should be kept warm by flannel underwear day and night, for if the skin is cold the capillaries are contracted and an undue quantity of blood is backed up against the heart. I must protest imperatively against the practice of frequent cold baths in children with heart disease. A rapid hot sponge bath is all that should be given. Tea should not be allowed children with valvular disease. Coffee in moderation is much less injurious. Tobacco should not be allowed. Boys affected with any form of heart trouble should never smoke cigarettes. The patients with aortic incompetency while asleep should lie flat in bed on the back, for in that position they lower the height of the distending column of blood, and thus relieve both the cardiac circulation and the tendency to pulmonary congestion. A change of climate is often necessary to favor compensation. High altitudes are injurious; never send such patients to Colorado or California. Low altitudes where the temperature is equitable and warm, dry or moist, are best. Such resorts are found in South Carolina, Georgia, Florida (particularly South Florida in winter), and some of the Gulf states. (See article on the "Geography of Heart Disease" in Hale's "Practice of Medicine.")

The treatment of dropsy due to valvular disease must be met by cardiac tonics, selected not from the symptoms alone, but by the pathological condition of the heart and kidneys. Dropsy may be caused by lack of arterial tension in the renal circulation, in which case digitalis is the chief remedy; next in value are caffein, strophanthus, adonis, convallaria, salicylate of theobromin (diuretin), spartein, apocynum cannabinum,

hellebore, veratrum album, etc. If the arterial tension is too high, owing to vaso-motor irritation, the remedies are aurum, glonoin, pilocarpin and iodide of sodium. We often find cases when it is advantageous, and even absolutely necessary, to alternate or combine these medicines with the digitalis group. In several cases I have removed cardiac dropsy with weak heart and arterial tension by giving digitalis and glonoin in alternation (one drop of the Ic of glonoin with one to three drops of the tincture or Ix of digitalis), every four or six hours.

In some cases it is absolutely necessary to run off the water through the bowels. Then we must resort to the bitartrate of potassa (10 to 20 grains every four hours), or elaterium, 1 to 5 grains of the 2x; or 1 drachm of epsom salts by the mouth or by enema, every 4 or 6 hours. While we are reducing the dropsy by these means, cardiac tonics must be administered to keep up the failing heart.

Cardiac dyspnea is one of the most distressing symptoms of valvular disease. It is often so severe as to simulate angina pectoris. As a rule, cactus, digitalis, kalmia and other cardiac remedies will palliate or remove it; but there are cases which require immediate relief, as the patient seems in danger of dissolution. Here glonoin acts with magical promptness and should always be at hand to be given by the attendant when required.

In a paper on "Glonoin in Heart Disease," read before the British Homeopathic Society, by W. Spencer Cox, M.D., he reports several cases of extreme dyspnea with cyanosis, unconsciousness, and other alarming symptoms, promptly relieved by a single dose of one drop of the lx dilution. Others were relieved by repeated doses of one drop of the Ic dilution. The relief was due to the power possessed by this drug of dilating the arterioles.

In some cases of extreme arterial tension, with powerful action of the heart, veratrum viride will act favorably. Quebracho will greatly relieve continuous dyspnea, but does not relieve a paroxysm as quickly as glonoin. Given in doses of 5 to 10 drops of the tincture, or 1-50 grain of its alkaloid (aspidospermin), every 3 or 4 hours, it renders the sufferer from dyspnea more comfortable, enabling him to move about without loss of breath. But cases will occur when all the above means will fail to give relief, and we are then reluctantly obliged to resort to morphine, preferably by hypodermic injections. In very young children it is safer to give on the tongue, one or two grains of the 2x trituration every two or three hours. Cocain in the same doses has been used with benefit. If, with the extreme dyspnea and high arterial tension, the patient is

constipated, or the stools are pale and offensive, mercurius dulcis lx every hour until purgation ensues, will surely give relief.

ENDOCARDITIS.

Endocarditis may occur in the fetus, and be found in the new-born infant. It is stated by Rauchfous, of St. Petersburg, that he saw three hundred cases of fetal endocarditis in several years. It is a little singular that so few cases have been reported in this country. I have seen and recognized but three in an obstetric practice of forty years, but I may have failed to recognize many more.

Endocarditis before birth usually affects the right heart. Of Rauchfous' 300 cases, 192 were in that side. It has been accounted for on the theory that the increased blood pressure on the pulmonary leaflets was the cause. It is a fact that most congenital cardiac diseases are located at the pulmonary orifice.

The endocardial hyperplasia in these cases is generally a soft, red, pedunculated vegetation, arranged at or about the tricuspid valves; sometimes on the mitral, and very rarely on the aorta or pulmonary artery. Arising during fetal life, they may, if the child survives, disappear; but they are apt to cause such structural changes as to give rise to cyanosis at birth.

Endocarditis arising after birth, is a more common disease than is apprehended. Very few physicians, unless they have some special interest in this subject, ever examine the heart of an infant during a fever, or during the eruptive diseases of childhood. Yet a fever in childhood may be rheumatic, and endocarditis may occur during measles, scarlatina, variola or typhoid. It has been observed as a concomitant of erythema nodosum. It is a common accompaniment of chorea; in fact, few cases of chorea exist without an endocardial complication. Rarely, it may be idiopathic, but it often exists as the first manifestation of inflammatory rheumatism. It often occurs in pleurisy, pneumonia, Bright's disease, diphtheria and pyemia.

Rheumatism, however, is the most frequent cause, and subacute rheumatism in childhood is very often unrecognized. Keating and Edwards ("Diseases of the Heart in Children") believe rheumatic endocarditis is more frequent in the child than in the adult. Out of twenty-one cases of rheumatism between the ages of fourteen and twenty, Vernay says only one escaped endocarditis. In forty-seven cases in children, D'Espine found only ten cases in which the sounds of the heart were perfectly normal. It is believed that the younger the patient, the greater the risk of the heart becoming affected.

Symptoms and Diagnosis.—Unless the physician has unusual

intuitive tact in the diagnosis of diseases of children, and is an adept in physical examination of the heart, he will often overlook an endocarditis. With the statement of the causes above mentioned before him, he ought to know when to be on the lookout for the disease—which is one-half the diagnosis. If the child is old enough, it will complain of a pain in the epigastric region; they will put the hand on the ensiform cartilage if you ask them to locate the pain. Some will complain of pain in the left axillary region. If the aorta is involved, they will complain of sharp pain along its course, especially on movement. All have a disinclination to lie on the left side, and when put in that position are very restless and anxious. In very young children close attention is necessary to enable us to recognize symptoms of cardiac pain. When the myocardium is involved, palpitation is a prominent symptom, the precardial distress is great; and a real "delirium cordis"—a tumultuous, violent palpitation—obtains as the disease advances, and sometimes ends in sudden arrest in diastole. The temperature is variable, often ranging between 102° and 104° or from 100° to 102°.

The pulse is at first accelerated, later it is feeble and dicrotic and very difficult to count. Respiration is greatly affected, dyspnea appearing early, and is very distressing. Sudden and alarming dyspnea appearing in the course of almost any febrile disease of childhood is an indication of serious cardiac implication. Cough is sometimes present and greatly aggravates the distress. Nausea and vomiting may be an early symptom and become violent, and towards the close may hasten dissolution by causing exhaustion and inanition. The patient may sink into an apparent typhoid state and death occur from heart failure in diastole.

Great irregularity and tumultuous action of the heart show increased severity of the disease, and the strokes of the apex against the chest become very marked. I have observed in some cases great distention of the veins of the neck with violent throbbing of the arteries.

Physical Signs.—Percussion is of no value. Palpation may reveal irregularity of the heart's action, violent throbbing, and often a vibratory thrill. Palpation will give the exact location of the apex-beat, and tell us when the left ventricle is seriously involved, for then its location will be changed, or may disappear altogether in pericarditis with effusion. It will also promptly inform us when myocarditis occurs. Auscultation will give us better information. It will generally reveal a systolic bruit or murmur at the apex. In children this murmur is sometimes heard with startling distinctness. This sound may not be

confined to the apex, but may be transmitted in every direction, even into the arteries. It is sometimes confounded with hemic murmur, or a pericardial bruit, but neither are so loud and distinct.

An accentuation of the second pulmonary sound should be watched for, as that means a damming back of the blood current through the lungs, and pulmonary engorgement. Engorgement of the right heart follows such engorgement, and then we shall generally hear a tricuspid murmur.

Prognosis.—While not necessarily fatal, our prognosis should be guarded. A complete recovery from a first attack is rare; there will remain some damage which will invite future attacks, or if not watched will result in chronic valvular troubles. It is especially in septic diseases of children that serious results are most to be feared; for the products of exudation or ulceration and emboli may be carried to the spleen, kidneys, or lungs, and cause engorgement, or to the brain, causing paralysis.

Ulcerative endocarditis, or bacterial endocarditis, is the most dangerous form. It may be caused by minute abscesses in the valves beneath the endocardium, or septic exudation processes; and are secondary to pyemia, or some infection poison in the blood.

Treatment.—This will depend upon the cause. If rheumatic, the food should be modified so as to prevent an acid condition of the gastric tract and its resultant acidity of the blood. If an infant not at the breast, the milk should be sterilized and soda or some alkali added. Even in nursing children, some alkaline water like Vichy, or pure soft water impregnated with soda should be given to drink. Sugar should be prohibited, and all starchy food not malted—(subjected to a prolonged second baking). Frequent alkaline baths are to be recommended.

It should be remembered that endocarditic rheumatism may occur previous to any other rheumatic manifestation. If a child has fever, and other causes are eliminated, always examine the heart. Several times in my early practice, by a neglect of this rule, I have found an endocarditis when it was too late. If we find the heart beating rapidly, forcibly, and the pulse small and hard, aconite is the remedy; but if the heart's beat and the pulse is bounding and very full, give veratrum viride. These two will control any fever in endocarditis from rheumatism, but they will not control the fever of septic and bacterial endocarditis. If the patient appears to have stitching pains, give bryonia, asclepias tuberosa, or arnica. If there are other rheumatic manifestations in the joints or muscles, salicylate of soda may be cautiously given. I have never found small doses, one-tenth to one grain every hour, cause any cardiac depres-

sion; but I have known larger doses to have that effect. The heart may tolerate them while the febrile excitement is at its height, but will not when the fever subsides. The salicylates should be stopped as soon as the heart becomes weak, irregular or intermittent. In this condition of the heart, cactus 1x, digitalis 1x, and spartein 2x are the chief remedies—5 to 10 drops of the former, and two grains of the latter, every three or four hours. Convallaria ought to be useful if there is much arterial throbbing and distension of the veins without fever; but Keating says he never saw any good results from its use. As it requires to be given in a low dilution, 1x, to be of any benefit, and as the stomach might reject it, if irritable, I would advise the use of convallaramin in doses of 1-100 grain in sweetened water every three hours. If the urine is scanty, red, and very acid, the salicylate, benzoate, or bicarbonate of lithia should be given in the 1x or 2x trituration—5 gr. in a tablespoonful of vichy water every few hours.

Much has been written about the danger of high temperature in cardiac inflammations. It has been alleged that should it go above 104° Fahr., degeneration of tissue will result. I do not believe the temperature ever goes above 104°, except in ulcerative endocarditis, in which any antipyretic, which forcibly lowers the temperature, does more harm than good. In such cases, I have found phenacetin 1x to have a beneficial effect in rendering the patient more comfortable and preventing heat-accumulation. It will certainly calm the nervous agitation, and the suffering from extreme heat, better than aconite. If the patient sweats profusely, stop its use and give coffea 1x, a drop or two every hour. There are other remedies which will be indicated during the course of the disease: namely, spigelia (a very important medicine), spongia, kalmia, apis, arsenicum, colchicum, cimicifuga, naja, phosphorus, scutellarin, and veratrum album. In treating heart failure, with cold dusky face and extremities, and almost imperceptible pulse, glonoin will exert wonderful restorative power—better than alcohol or ammonia; but it must be followed closely by, or alternated with, arsenicum, veratrum album, nux vomica, digitalis or cactus. A patient with endocarditis should be placed at perfect rest, not taken up or carried about, but soothed by the mother or nurse lying down by it. The room should be dimly lighted; no excitement or visitors permitted, and no talking allowed by the bedside. If the child is very restless, some nervine, like scutellarin, passiflora, coffea, or mono-bromide of camphor should be given. I have had good results in such condition from sulfonal and phenacetin, 2 to 10 grains of the 1x in infants under three years, and the same quantity of the crude drug in older patients.

In the discussion on a paper read before the British Homeopathic Society (1893), by the late Dr. A. H. Buck, Dr. Byres Moir referred to his hospital experience among the poor children in London. He saw no reason why pericarditis, as well as endocarditis, should not be congenital. The rheumatic symptoms of children with endocarditis were insignificant, consisting of a few aching pains; but on listening to the heart a bruit would be heard. There was scarcely a day when he did not find two or three children, among his out-patients, with well-marked symptoms of endocarditis. He quoted Dr. V. Green, who stated that endo- and pericarditis are found often in very young children, and as the age increases the percentage becomes less. Dr. Moir said the form of pericarditis in children was very interesting. He had seen several cases where the pericardium was totally adherent. These cases were very often associated with chorea. He had found aconite acted well in the first stage, and bryonia or mercurius in the second stage of effusion. Dr. Blakely said he had frequently seen cases of congenital endocarditis with hypertrophy. In these cases there were pericardial adhesions, apex-beat two and one-half inches outside the nipple line, and the action of the heart tumultuous and irregular to the last degree. The consensus of opinion relating to treatment was that aconite, bryonia, and mercurius were very useful remedies. Dr. Wyman Thomas had seen good results from salicylate of soda when aconite and bryonia failed. In several cases he gave ten grains every hour until the pain was relieved. Dr. Lough highly praised veratrum viride. Dr. Clifton said we should not neglect to study, in cases of rheumatism of the heart, kalmia, arnica, colchicum, guaiacum, lycopodium and sanguinaria. Dr. Edward Blake entertained no doubt of the possibility of intra-uterine pericarditis. If anything interfered with the placental functions—and the after birth is the only fetal emunctory—toxines could be stayed in the fetal system, and any or many of the recognized septic invasions would take place.

I (Hale) believe that if closer investigations were made into the causes of death in still-born children, or those who die shortly after birth, evidence would be found that the heart had been diseased in utero from some disease of the mother, namely: rheumatism, Bright's disease, gonorrhea, syphilis, or pyemia. Dr. Blake's suggestion was eminently practical.

PERICARDITIS.

Pericarditis is an inflammation of the pericardium or serous covering of the heart. This covering is composed of two layers, the visceral and parietal; both may be inflamed. As

a rule it becomes general; only very rarely does it exist uncomplicated with endocarditis and myocarditis. It is believed by many authorities that pericarditis is more common in the infant than in the adult. There is no doubt that it is frequently unrecognized, for it is a fact that *post-mortem* examinations reveal its existence when it was not believed to exist during life.

Rheumatism is without doubt the principal cause of pericarditis; it has been observed in the newly-born infant. It may be caused by typhoid fever, scarlatina, measles, variola, the retrocession of eruptions, and Bright's disease. Some cerebral affections in children may coincide with pericarditis. Rillet and Barthez, in 300 cases of death by tuberculosis in children, observed ten cases of deposition of tubercles in the pericardium with acute inflammation of that tissue.

Sibson reports that out of 326 cases of rheumatism, 63 had pericarditis, and 25 of these were from sixteen to twenty years of age. All the fatal cases were under twenty years of age.

Symptoms.—Like endocarditis, pericarditis may be acute or chronic, primary or secondary. The symptoms are generally masked, latent, and ill-defined during the early stages. A symptomatic diagnosis in the child is beset with numerous difficulties. The marked local pain observed in the adult is not so well defined in the child. It is not as able to point out the seat of the pain. It may be mistaken for pleurisy or pleuropneumonia of the left side. If there is a rheumatism or eruptive fever present, we shall be better able to make a diagnosis. The cough, respiration, pain on movement, and complaints of pain during these actions, may arouse our suspicions; but we cannot be certain of the existence of pericardial inflammation without the aid of auscultation, and this will not greatly aid us until sufficient lymph has been exuded to roughen the surfaces of the pericardium, or an effusion has formed with its undoubted characteristic symptoms. Then a diagnosis can be surely made.

Keating and Edwards ("Diseases of the Heart in Children") give the following local physical signs: "We may then rely first upon the friction murmur and later upon the muffled heart-sounds, which may eventually almost entirely disappear, especially at the apex, the sounds at the base being heard until the fluid completely distends the pericardial sac; the friction-sound or murmur will also linger until this condition pertains. This friction-sound is to and fro, that is, synchronous with the systole and the diastole, the former causing the inflamed and roughened surfaces to closely approximate, the latter to recede. We must bear in mind that the heart of a child is much nearer the auscultator's ear than that of an adult; forgetting this point, auscultation is apt to be very confusing and misleading in the

young. The friction-sound, if it exists, will rapidly become more apparent, as in the child the membrane is formed with great rapidity. In pericarditis the bruit or murmur which is heard over the precordia may have two sources of origin: it may be due either to an intercurrent endocarditis or to pericarditis alone and uncomplicated. A pericardial murmur in a child may closely simulate an endocardial bruit. The special and diagnostic characters of a pericardial friction murmur are as follows:

"It is usually basal, or directly over the body of the heart. The murmur is almost always double, or to and fro.

"It is not transmitted into the vessels and circulation, but may be heard in a child over a much larger precordial area than in the adult. It is but rarely, however, heard over the posterior left thorax. The murmur, particularly in the young, will be altered by the position of the patient in being intensified as the subject leans forward, and rendered less audible during full inspiration or in the reclining posture. The effusion is apt to arise somewhat rapidly, and by inspection we may note a pericardial bulging, which, in children, is marked, and arises early. The ribs being flexible and the thorax small, the bulging becomes more apparent. A rachitic deformity of the chest must be differentiated from the bulging due to an effusion.

"The distention of the pericardium will cause upward displacement of the apex-beat. This is coincident with the formation of the fluid, and is proportionate to its quantity. In cases where any amount of effusion has been poured out, the apex may be displaced one or more interspaces. The cardiac impulses, like that of an adult under similar conditions, will be materially diminished. The symptoms on palpation are about the same in both the child and the adult.

The general symptoms are as follows: The disease may be ushered in by chill, fever, cerebral symptoms, such as delirium or choreic movements, followed by somnolence. The pulse at first may be regular, but as the cardiac muscle becomes weaker the circulation becomes irregular, and the radial pulsation feeble and intermittent. Later the pulse becomes small, irregular and intermittent; there spiration is much embarrassed; extreme dyspnea may arise, and even apnea appear, with actual asphyxia." The temperature increases with the severity of the disease and in scarlatinal pericarditis I have known it to reach 106° Fahr.

Prognosis.—Recovery from pericarditis is common. It is not as fatal as endocarditis, but adhesions may form and cause dilatation of the cavities of the heart. This disease has been known to occur in the fetus and new-born. In children dying

thirty-six hours after birth pericardial adhesions have been found. Pyemic pericarditis may follow inflammation of the umbilical cord.

Treatment.—The treatment of pericarditis calls for many of the medicines used in endocarditis, especially aconite, veratrum viride, bryonia, asclepias tuberosa, apis and salicylate of soda. In addition, especially when effusion of lymph, or exudation has occurred, we shall find iodide of arsenic, iodide of potash, apocynum cannabinum, and iodine frequently indicated. To maintain the strength of the heart-muscle we are imperatively obliged to resort to cactus, digitalis, caffein and spartein, and they must be used in physiological doses, namely, one or two drops of the tincture, or one grain of the 1x trituration every two or three hours. The same hygienic measures recommended in endocarditis should be adopted.

The treatment of pericarditis with effusion combines medical and surgical measures. As soon as percussion and auscultation shows the presence of fluid in the pericardial sac, the kidneys should be stimulated to action, and at the same time the muscular structure of the heart should be toned up. This is best accomplished by the use of digitalis and apocynum cannabinum. Both have a similar action on the heart and kidneys. The dose of digitalis may be stated to be one drop for every two years of the child's age, namely, one drop every three hours for a child of one year and six drops for a child of twelve years. If the tincture of apocynum is used, the same dose is efficient. I prefer the decoction prepared after my formula in "New Remedies;" of this, ten drops is equivalent to one drop of the tincture. Spartein is often very useful. The dose of this is one grain of the 1c every two hours for an infant under two years of age, increasing one grain for each year of the child's age. If these medicines do not keep up the action of the heart, alternate them with nux vomica 1x, or strychnia 3x. If the bowels are constipated I should not hesitate to give 1-100 grain of elaterin every four hours, or enough to cause watery motions. This will aid in relieving the cardiac dropsy.

In no other disease is it so important to keep the patient absolutely quiet, even if we have to tie the child to the bed or cradle. Death has occurred suddenly from allowing the child to sit up in bed, or turn suddenly from side to side. Stimulants should be given; the best are champagne, tokay and brandy.

Paracentesis pericardii.—This has been resorted to when medicines will not cause absorption of the effusion, and when there is great danger of heart failure. The surgeon should not wait too long, as delay is apt to set up fatty degeneration of

the muscular wall of the heart and dilatation of its cavities. "Use an aspirator with a vacuum jar, and a delicate double canula. The innermost portion may be either a solid needle or a needle-pointed tube, either of which are to be withdrawn, the former entirely, and the latter until its point is sheathed." —*Keating.*

The point selected to aspirate is where there is the least danger of wounding the heart-muscle. "This is either in the left costo-ziphoid angle, pushing the trocar upward toward the heart; or by inserting the trocar at the fifth interspace, about where the apex should normally be situated when it is not displaced."—*Keating.*

For further minute direction refer to Keating and Edwards, p. 88, also Table of Cases, p. 90.

MYOCARDITIS.

This disease is generally so complicated and associated with endo- and pericarditis, and so difficult to diagnose during life, that it needs only brief mention.

Dr. Blache ciassifies as follows the diseases with which myocarditis may be associated:

General diseases	General illness. Grave fevers—variola. Cachexia.
Local causes	Diseases of pericardium. Diseases of endocardium. Diseases of vessels of heart. Abscesses or tumors of heart.
Alteration in circulation	Embolism. Thrombosis. Atheroma. Edema.

Symptoms.—The symptoms of myocarditis depend, of course, on its form and the extent to which the disease has progressed. When the lesion is small and limited, few, if any, symptoms exist at all by which a clinical diagnosis can be made. If, however, the lesion is extensive, then we meet those symptoms which we all recognize as characteristic of heart-disease, as dyspnea, palpitation, dropsy, visceral derangement, or precordial discomfort; nervous symptoms are peculiarly liable to arise early in these cases.

Most cases of myocarditis pursue a long course; should, however, an aneurism develop, the case will be more rapid. In other cases sudden death may occur from cardiac arrest. The most usual termination, is, however, by dropsies, pulmonary complications, or by exhaustion.

Traumatism may cause myocarditis, and rapidly prove fatal. A case is recorded of a child aged twelve, who was kicked over the heart and died shortly afterwards with abscesses in the heart-muscle.

"The diagnosis is indeed difficult, and in many cases quite impossible; this is particularly true of the so-called cerebral form of myocarditis, which is especially noticeable during early life. Burnheim reports several cases in children. A child aged twelve, with febrile symptoms, delirium, agitation, and dilated pupils, died four days after admission. Child never had a pain in the chest, or heart-irregularity, or cardiac palpitation. At the *post-mortem* the heart was of a deep-red color, softened, and easily torn; in the walls of both ventricles a number of abscesses were found, with quite a number beneath the visceral layer of the pericardium; auricular muscle softened. Heart-clots were numerous. It is a clinical nicety to differentiate between cases of subacute or chronic myocarditis, and the heart that accompanies emphysema, or that seen with renal disease, or, again, the heart that is altered by fatty degeneration."—*Keating.*

The chief indication is to prevent heart failure. In cases of young children with delicate stomachs I would advise the use of the alkaloids of the cardiac remedies, for the small doses required are much more easily administered and retained. Adondin, convallarin, digitalin, spartein, strychnin, and cactina in doses of 1-1000 of a grain (3x) are quite efficient if frequently repeated. I must here refer again to the necessity of absolute rest. Unless we can accomplish this, no medicine can relieve or cure our little patient. In cases of threatened heart failure from overexertion, give glonoin on the tongue. If abdominal distension interferes with the action of the heart, empty the intestines as quickly as possible.

SYMPTOMATIC INDICATIONS FOR MEDICINES IN DISEASES OF THE HEART.

[Only the most important are here mentioned. The well proven remedies are mostly omitted, as their symptoms are familiar to all].

Aconite.—Fever with great restlessness and anxiety; high temperature; hot, dry skin; thirst; pulse small, hard and quick; stitches in the region of the heart with sudden crying out, moaning and tears; rapid and painful respiration. Indicated in acute pericarditis, endocarditis and myocarditis.

Arsenicum.—Fever of low type, with intense thirst; sometimes unquenchable, at others drinking only a little at a time; temperature sometimes high, sometimes sub-normal; uncontrollable restlessness and anxiety, great dyspnea—cannot lie down;

feeble, irregular pulse. Indicated in ulcerative endocarditis; inflammation of the valves, during the progress of Bright's disease, or typhoid fever; dilatation of the heart with local or general edema.

Adonis Vernalis.—Indicated in chronic valvular disease, or dilation with hypertrophy, with general anasarca, dyspnea, scanty urine, cardiac dyspnea, pulse feeble, irregular or intermittent. In such cases it acts as a cardiac tonic and diuretic when digitalis has failed. Dose one to ten drops of the 1x in infants repeated every two hours. In older patients one to five drops of the tincture.

Apium Virus.—Sudden general edema, with suppression of urine occurring during pericarditis, scarlatina, or from a sudden cold after being overheated. Stinging pain in the region of the heart, dyspnea, very rapid breathing, with intense mental anxiety. Always prescribe the trituration—2x to 6x.

Amyl Nitrite.—Sudden fainting; cardiac failure; with collapse, pulselessness, or feeble, irregular, almost imperceptible pulse; cyanosis, cold face and extremities; dusky lips and fingers, cold sweat. A few drops on a handkerchief placed before the nose and mouth. As soon as a full pulse appears suspend the inhalation. In desperate cases administer it hypodermatically (one drop mixed with fifteen of water).

Apocynum Cann.—This root contains a substance the physiological and therapeutic effect of which is said to resemble that of digitalis, except that it does not possess the cumulative power of the latter.

Administered in the form of the fluid extract in doses of ten to fifteen drops, three times daily, Canadian hemp is said to render the pulse slower, and at the same time fuller and stronger. In cases of dilatation of the heart, it is stated, it rapidly causes a decrease in the area of cardiac dullness; and in patients affected with valvular lesions, it renders diuresis manifestly more active, does away with the edema, and determines the disappearance of palpitation and dyspnea. The remedy is usually well borne by the patients when administered in the stated doses; the only disagreeable effect is occasionally a feeling of throbbing of the blood-vessels in the head.

Dr. Glinsky reports its effect on himself; being affected with hypertrophy of the left ventricle with dilatation of the heart, manifested in paroxysms and accompanied by a systolic murmur at the apex (symptom of mitral regurgitation), precordial angor and dyspnea, increased by the slightest movement. Under the influence of the fluid extract of Canadian hemp, he found that all the morbid phenomena, both subjective and objective, subsided in two days; the pulse, which beat at the rate of

110 per minute, fell to 80; and the dyspnea was so completely suppressed that even a lengthy walk did not cause the slightest feeling of oppression.

In cases of valvular lesions of the heart, with symptoms of hyposystolia, in which strophanthus, adonis vernalis, and convallaria majalis had been administered without effect, Dr. G., in a few days, effected, by means of Canadian hemp, the disappearance of edema and dyspnea, as well as marked reduction of the area of cardiac dullness.

It has been noticed, for many years, by myself and others, that when this drug was given for dropsy, the condition of the heart greatly improved. The fact that *apocynin*, its active principle, acts like digitalin, accounts for that result. Like digitalis, the infusion or decoction often acts better than the tincture. For children, five to ten drops of the 1x every two hours, or double that quantity of the decoction, acts very happily.

Glonoin.—Is applicable in cases when the emergency is not as urgent, although if given hypodermatically it acts almost immediately. The indications are the same as for amyl. Both dilate the arterioles and allow the blood to flow freely from the central portions of the body to the periphery. If given when the capillary circulation is arrested or stagnated, either from vaso-motor spasm or cardiac failure, the terminal vessels dilate and the congested heart is emptied of the blood in its cavities, which it was not strong enough to expel. No stimulant acts as quickly and beneficially in the cardiac or pulmonary diseases of children. Its timely use will ward off dangerous conditions approaching collapse.

Aurum.—Is primarily indicated in acute congestion of the heart, great blood vessels, and brain; also in endocarditis, when palpitation, suffocative anguish, and constriction of the chest are present, indicating diseases of the aortic valves.

Cactus.—Dyspnea, anxiety, screaming with fear, sensation of an iron hand grasping the heart, with constriction of the whole chest. The pulse may be full, bounding, but soft, with some arterial congestion of the head; or pulse small, weak, irregular, or intermitting. *Primarily* indicated in small doses in acute congestions, and cardiac inflammations in the 2x to 6x dilutions. *Secondarily* indicated in hypertrophy with dilatation, all the valvular lesions when the heart is weak, with concomitant dropsy; hemorrhages, and cardiac dyspnea—in doses of five to twenty drops of the 1x or tincture, three or four times daily.

These directions for dose are not theoretical, but deductions from my experience in the use of the drug.

Convallaria.—Violent palpitation; pulse large and empty; throbbing and visible pulsation of the arteries (Corrigan's

disease), or small, irregular, weak, and intermitting; distressing dyspnea; pain about the heart radiating into the left arm, and down along its internal aspect into the fingers. Dropsy with general or local edema; mental depression, melancholy or hysterical symptoms. Suitable to infants after scarlatina, young girls at puberty who suffer from reflex cardiac neuroses; pseudo angina pectoris (in which the dose should be small, 2x to 4x). Valvular disease, especially aortic, or when the right heart is dilated; in which the dose should be gtts i to v. of the tincture.

Coffea and Caffein.—Coffea cruda is an invaluable remedy in neuroses of the heart in infants and young children and girls. The subjects in whom it is indicated are the offspring of neurotic parents who suffer from the effects of social dissipation or abuse of stimulants. The little patients are sleepless, irritable, affected unpleasantly by unusal noises or emotions. When sleepless or excited it will be observed that the hearts action is rapid, violent, and often irregular. In such cases the 3x or 6x dilution will act in the happiest manner. Caffein in the 6x or 12x will be equally suitable.

Caffein causes secondarily—*i. e.*, in toxic doses—paralysis of the heart in diastole, if its primary contraction in systole is not fatal. It is therefore valuable in physiological doses as a cardiac tonic when the heart is suddenly threatened with paralysis. The hearts of children, during peri- and endocarditis, are more prone to paralysis than those of adults. It follows well amyl and glonoin, after the immediate danger is passed. In such instances under the use of the 1x or 2x in three to five grain doses every hour, the heart soon regains its force, and if dropsy is present, the kidneys soon resume their normal function.

Carpain.—This is an alkaloid obtained from the leaves of the carica papaya, or "paw paw" tree of Florida and the tropics. It is from the fruit of this tree, which looks like a small melon, that the digests variously called papayotine, papaine and papoid are made. It is said that this digestive principle is found also in the leaves and bark, but the juice of the leaves cannot be inocuous if carpain is found in it, for it is a heart poison like digitalin.

Dr. Von Orfele, who experimented extensively with carpain, found it to act like the digitalis group of cardiac drugs. In doses of three-eighths grain per diem it caused similar disturbances in the rhythm, blood pressure and the pulse characteristic of digitalis. He also found that carpain was the only congener of digitalis that could be used hypodermatically without causing irritation and abscesses. The cardiac diseases for which it has been found most useful are aortic insufficiency and stenosis. In doses of one-tenth grain daily it effected reduc-

tion of the frequency of the pulse, also alleviation of the dyspnea, and doubled the quantity of urine. This means doses of one or two grains, of the 2x trituration, repeated several times a day. Or, it is probable that the writer means that the one-tenth grain be given at a single dose, as the one-sixtieth grain of digitalin is now often given and allowed to act for a day or two.

Coronillin.—The glucoside from coronilla scorpioides, an European plant, is equal in power to digitalin. Not sufficient experiments have been made on warm-blooded animals or provings on men to enable us to decide just how it affects the heart. We only know from empirical data gained from its use in dropsy from cardiac disease, that it causes profuse diuresis, followed by great improvement in the condition of the heart. One authority who has experimented with it says it differs from digitalis in not causing as much contraction of the arterioles as digitalis. The dose is one or two grains of the second or third trituration.

Digitalis.—As thoroughly as the best physicians of all schools are supposed to understand the action of digitalis, it is still often used inappropriately. It is too often the routine habit to give this drug when some valvular lesion is discovered, and there is at the same time a quick, irregular or intermittent action of the heart. But this is not an indication for its use, unless the pulse is soft and there is unmistakably a *low tension in the arteries with venous stasis.* Here it will always act favorably; but if there is high arterial tension, or even normal tension, material doses will act unfavorably.

If the primary symptoms of digitalis are present—*viz.*: rapid and strong, or quick and hard beating of the heart, with high tension pulse, digitalis is indicated only in infinitesimal doses, but I confess I have never seen good effects from its use in such cases; aconite always gives me better results. But if the pulse is feeble, small, or large but soft, or "empty," showing very low arterial tension, (which means a thin or weak heart) then digitalis in physiological doses, will nearly always act well. By physiological doses I mean for children, one to ten drops of the 1x dilution or 1x trituration. If the infusion is used the dose is ten to twenty drops, graduated according to the age of the patient. Rely more on the objective than the subjective symptoms. If the child is dropsical the attention to the state of arterial tension is of great importance. If the tension is above normal in the pulse, it is high in the kidneys, and then digitalis will not act as a diuretic in material doses, for it will increase the tension in the renal vessels, and sometimes suppress the urine. Too high or too low tension in the renal arterioles will cause dropsy. Too high tension is rendered

normal by aconite, glonoin, aurum, veratrum viride and a few others. Too low tension is benefited by digitalis, caffein, strophanthus, cactus, adonis, spartein and nux vomica.

Erythrophlein, (casca) has been found to constrict the arterioles and cause a higher tension than digitalis, and may be used when digitalis is indicated, but is not well borne by the stomach even in small doses. The dose of casca for children need not exceed five to ten drops of the 1x or 2x dilution repeated every two or three hours until its favorable effects appear.

Oleander.—It sometimes occurs that during the treatment of valvular disease, or a weak, irritable heart in children, there will set in a lientery which rapidly reduces the strength of the patient. We have in such cases an admirable remedy in oleander. Besides the evacuations of undigested food , the sudden movements of the bowels after taking food, which characterizes lientery, we find other important symptoms, *viz.*: great prostration, stupor, dilated pupils, thick speech, anxiety about the heart with fear and trembling, pulse small, irregular, intermitting, often sinking to a thread, and suffocating, choking sensations. Sometimes the heart beats slow, at other times rapid and violent. For these symptoms the 2x or 3x dilutions are appropriate.

Spartein.—This drug which resembles convallaria and cactus, has one advantage which they do not possess. It acts more rapidly than any other cardiac sedative and tonic. Its quieting effect over a weak and irritable heart is often observed in less than an hour. It does not control irregularity of action, as well as abnormal rapidity. Hence it is the remedy for tachycardia in children. The other conditions in which it is useful are pulmonary emphysema with chronic myocarditis and irritable heart ; insufficiency of the aortic valves ; valvular disease with failing compensation ; weak, rapid action of the heart in Bright's disease, with deficient action of the kidneys, dropsy, ascites, etc.

In threatened heart failure during scarlatina with endocarditis, one-tenth of a grain of spartein hypodermatically will act in fifteen minutes, and will thus sustain the temporary stimulation of amyl or glonoin. As a heart tonic and sedative use the 2x trituration in young infants, the 1x in older children, repeating the dose every two hours.

Spigelia.—The symptoms indicating this drug are too well known to be recorded here. When called for by those symptoms it is of inestimable value in acute peri- and endocarditis ; the painful and stormy palpitations of all acute and chronic cardiac maladies ; but especially in violent cases of persistent tachycardia, exophthalmus, and chorea of the heart.

Many functional disturbances of the heart are due to the reflex irritation set up by worms in the stomach and intestines. Here spigelia has a happy effect in quieting such disturbances, but in order to prevent their recurrence the parasites should be expelled.

Squilla.—At the time the original proving of squilla was made, no method of testing its effects upon the heart was in use. But if a careful study of these provings be made, it will be seen how closely its chest and respiratory symptoms compare with the bronchial and pleuritic troubles which are so often present in mitral lesions. Owing to the imperfect supply of blood to the lungs in the mitral disease, the lungs and especially the bronchial mucous membrane becomes congested this causes a profuse flow of mucus (bronchorrhea) or acute bronchitis, also edema and venous stasis of the lungs, and even pleuritic effusion. The cough in such cases closely resembles the cough of squilla, namely loose, rattling, constantly harassing day and night, sometimes loose, then dry, spasmodic, disturbing sleep; loose in the morning, dry in the evening. The expectoration is either glairy or bloody and is very difficult to raise, although a large quantity seems to be in the chest. The allopathic abuse of this drug is fearful. They give it to "loosen the cough." They do not know that the bronchorrhea which they cause is due to the congestion of the lungs and bronchial mucous membrane, depending on cardiac weakness and irregular action, and that many of the cases of so-called bronchitis and pneumonia in children are made worse by the toxic action of squilla. If the patients did not vomit up most of the drug the mortality would be greater. The pathogenetic action of squilla is not unlike convallaria—(all the liliaceæ, in large doses, are more or less cardiac poisons). The primary effect of large doses of squilla is to cause increased force and more rapid contractions of the ventricles, the pulse is small and hard, wiry, then becomes irregular and very rapid, and finally ceases from tonic closure of the ventricles. During this time the pulmonary circulation is rendered imperfect, and there is present passive congestion. Hence the cough, mucus rales, bloody sputa, dyspnea, pleuritic pains, profuse urine, etc. It is my conviction that nearly all the symptoms of the chest and urinary organs caused by squilla are produced by the action of this drug on the heart, and, except in some cases of influenza, it is only indicated in chest affections when cardiac disorder is present. Many of the cases diagnosticated as bronchitis, pneumonia and pleurisy in children are probably due to acute endocarditis, pericarditis, or chronic valvular diseases, which we now know are very common in early life. In acute cases, presenting the

characteristic symptoms of squilla, it should be given in minute doses (third dilution), or the malady will be dangerously aggravated.

Per contra, in cases of cough, dyspnea, bronchorrhea and pleuritic affections of a neglected or chronic nature, when the symptoms often assume the character of the secondary symptoms of squilla, namely, constant hawking, loose or dry cough, great oppression of breathing, aggravated by movement and lying down, the face pale and cold, hands and feet cold and blue, heart's action feeble, irregular, palpitating, but always deficient in force, urine scanty, red, painful and often bloody, this remedy will be found promptly curative in larger but not pathogenetic doses. I have found the first dilution, in doses of five drops every hour or two, or the first trituration, in grain doses, act with the happiest curative effect. In dropsy from valvular disease it should not be used empirically, but always selected by the totality of its symptoms.

Sterculia (Kola). — Kola, by the caffein and theobromin which it contains, is a tonic of the heart, whose pulsations it accelerates, while it increases its power and regulates its contractions. In the second phase of its action it becomes, like digitalis, a regulator to the pulse, whose energy it raises; under its influence the pulsations become more ample and less numerous. As a result of its effect on the vascular tension, diuresis augments, and this fact renders it valuable in affections of the heart with dropsy. It is a waste restrainer, diminishing the losses of the economy from the combustion of the azotized compounds, probably from special action on the nervous system. It is a powerful tonic by the principles which it contains, and its employment is indicated in anemias, in chronic affections of debilitating character, and in convalescence from grave fevers. It favors digestion, probably by augmenting the secretion of gastric juice, and by acting on the unstriped muscles of the stomach, which it tonifies. Under its influence anorexia disappears, and the digestive functions become more regular.

Kola increases the assimilation of food, and in cases of weak heart with chronic intestinal catarrh in children, will form an invaluable remedy.

Lastly, it is an anti-diarrheic medicament of great value, and as such has rendered good service in chronic diarrhea, and in certain cases of sporadic cholera, although its action in these instances may not as yet be clearly explained. The mother-tincture may be used in doses of five to thirty drops. It can be given pleasantly in sweetened milk. Infants and children will take this without objection.

Stigmata Maidis (Corn silk).—This apparently simple drug

is of great value in some of the milder cases of chronic valvular disease with deficient compensation. The symptoms indicating it are: weak action of the heart, with irregular, intermittent pulse, deficient quantity of urine with frequent and urgent desire to urinate, only a small quantity being passed. Edema of the lower limbs and even general dropsy. Under the use of five to ten drops of the tincture every three hours, the urine will increase in quantity, and the irritability of the bladder decrease, while the dropsy and weak, irregular action of the heart will disappear.

Strophanthus.—This remedy has attained a good reputation as a substitute for digitalis. It is not open to many of the objections against the latter. It does not contract the arteries to the same extent; or derange the stomach, or show any of the so-called "cumulative action." It is also efficient in smaller doses. This refers to its physiological action. Of its strict homeopathic uses we know but little, as we have no provings. There is one group of symptoms, however, which it has caused when given in too large doses. They are complete anorexia, disgust for all food, gagging and choking from regurgitation and vomiting of food soon after eating, with severe diarrhea. These symptoms sometimes occur during acute endocarditis, and then the 3x dilution will soon remove them. The following are the conditions it has removed: "In valvular weakness in the stage of compensation disturbance, tincture of strophanthus will retard, strengthen and regulate the cardiac action. The retardation occurs first, while the regulating effect only takes place as a rule, after a few days. Dyspnea and edema are promptly relieved. But the favorable effects, in about one-half the cases, do not appear with the regularity and safety peculiar to digitalis; and in most cases in which strophanthus failed, digitalis was effective. Digitalis has, generally, a quicker and more thorough effect, especially in causing diuresis, while strophanthus affects a disturbed respiration far more favorably. It is more difficult to indicate strophanthus than digitalis in cases of valvular weakness, so that it is almost impossible to say beforehand in what case strophanthus will be successful.

In chronic degeneration of the cardiac muscle, with usually a small, frequent and irregular pulse, great difficulty in breathing and edemas, tincture of strophanthus may be relied upon.

In acute and chronic nephritis the effect of strophanthus is not so marked as in the above mentioned affections. The dyspnea often yields to its influence as in the other diseases, but the diuresis and edemas are not favorably affected by it.

It cases of palpitation and apnea of nervous origin, strophanthus often gives marked relief.

Edemas of cachectic character may be also favorably affected by it. For children, begin with doses of gtts. vij. of the 1x in a teaspoonful of water or wine, and add gtts. ij. to each dose until the effect is obtained, though it is not advisable to give more than gtts. xx every three hours.

The effect usually appears on the second or third day, and generally lasts a week or two weeks, though there is considerable variation.

Zinc cyanide.—This drug is of great value in angina pectoris, and those reflex affections of the heart in children, which arise from irritation of the brain or stomach. The symptoms are sudden, violent pain in the region of the heart, with pale face, dusky lips, tossing about in anxiety, irregular, feeble pulse, vomiting, and sometimes stupor and convulsions.

PART VIII.

DISORDERS OF THE URINARY TRACT

CHAPTER I.

THE URINE OF INFANCY AND CHILDHOOD.

Quantity of Urine in 24 Hours.—During the first ten days of life the infant passes, according to Cruse, from 130 c. c. to 417 c. c. (4 to 14 ounces). The quantity increases rapidly during the first ten days, but more slowly during the next week. At the end of the first month the average is from about 200 c. c. to 300 c. c. (6 to 10 fluidounces). During the first year, the average is from 300 c. c. to 400 c. c. (10 to 13 fluidounces).

During infancy the child passes about one fluidounce (30 c. c.) for each pound (half-kilogram) of weight: this figure applies especially to children between three and seven years of age.

The following table shows the figures of different observers in regard to the quantity of urine in 24 hours:

ULTZMANN.	HERZ.
Infancy.....300 c. c. (10 fl. oz.) Increasing 100 c. c. (3 fl. oz.) for each year until the 15th, when the normal quantity is 1500 c. c. (50 fl. oz.).	Boys of 8.....700 c. c. (23 fl. oz.) Girls of 8.....600 c. c. (20 fl. oz.) Boys of 10.....750 c. c. (25 fl. oz.) Girls of 10.....700 c. c. (23 fl. oz.) Boys of 12.....1000 c. c. (33 fl. oz.) Girls of 12.....800 c. c. (26 fl. oz.)
SCHABANOWA.	**CHARLES.**
2 to 4 years...500 c. c. (16 fl. oz.) 5 to 9 years..1000 c. c. (33 fl. oz.) 10 to 13 years..1500 c. c. (50 fl. oz.)	3 to 5 (boys) ...750 c. c. (25 fl. oz.) 3 to 5 (girls) ...700 c. c. (23 fl. oz.)

In regard to the 24 hours' urine of the healthy new-born, Parrot and Robin think 150 to 300 c. c. (5 to 10 fl. oz.) the average from the 6th to the 30th day; in other words, a new-born child passes four or five times more urine per kilogram of

weight than an adult. Their observations on the quantity of morning urine voided were as follows:

1st to	5th	day,	morning	emission..... 5 to 10 c. c.
5th to	10th	"	"	" .....10 to 25 c. c.
10th to	15th	"	"	" .....15 to 30 c. c.
15th to	30th	"	"	" .....20 to 30 c. c.
30th to	150th	"	"	" .....25 to 35 c. c.

Clinical Note.—If then the urine diminishes notably it is because the child is sick or is fed in an insufficient manner.

Collecting the Urine of Infants.—In order to collect the urine of young children, place a clean sponge over the genitals and fasten the diaper over it. The sponge, when saturated, is removed, squeezed out over a lipped dish, and the urine poured from the dish into a bottle or glass for measurement and examination.

Color.—The normal urine of young children has little color, light yellow at most. If the first act of micturition be delayed twenty-four hours, the color of the urine will be dark, from concentration in the bladder.

In two-thirds of the cases mentioned by Parrot and Robin,* the urine of the new-born was absolutely watery; in the others very slightly tinged, of great refractive power, and of very light, straw-color, like that of old Chablis; more rarely green reflections were noticed, especially when seen by transmitted light; after standing some hours exposed to the air, the color deepened a little. During the first days of life, when the new-born child loses something of its initial weight, the urine is often more highly colored—rather yellow like that of the adult. The color may be further modified by the weight of the child and its alimentation; thus, it is darker with heavy children, and paler with those nursed by their mother than those who are brought up on the bottle or otherwise nursed.

Temperature.—The temperature of the urine of the healthy new-born child varies only in a very small range, from 98.2° to 99.3°.

Odor.—The urine of children has, in health, less odor than that of adults. After standing for a time, the odor somewhat suggests that of veal broth. Colorless urine is usually inodorous; that which has more color has a feeble, urinous odor, which boiling does not sensibly develop.

Specific Gravity.— Contradictory statements are found in regard to the specific gravity. At birth the specific gravity is said by some to be about 1010; it then sinks as low sometimes

* G. E. Shipman's Translation, Chicago, 1878.

as to 1002, by the tenth day, gradually rising again. At the age of a month it may be as low as 1003. In general, during infancy, it varies from 1003 to 1006, though Schabanowa places the figures at 1011 between two and four, 1013 from five to nine, and 1012 from ten to thirteen.

Cruse says that the specific gravity increases rapidly from the fifth to the tenth day, then diminishes; that the average specific gravity is from 1005 to 1010.

According to Parrot and Robin, with children from five to thirty days old, the mean density of the urine varies from 1003 to 1004. The product of the first urination is denser and attains the figures 1005 and 1006. From one to four months the density is 1004 and 1005. According to Quinquand, the density at birth is 1003; about the 10th or 15th day, 1006.

Reaction.—In the new-born the urine is normally neutral in reaction, only exceptionally being feebly acid. If the first micturition is delayed twenty-four hours, the urine may be acid from concentration in the bladder.

Clinical Note.—Acid urine in the new-born is indicative of something wrong in the regimen as, for example, too long an interval between the nursings.

Appearance.—For the first four or five days after birth the urine of children is rather turbid, owing to presence of epithelia, mucus, urates, and occasionally calcium oxalate. Later it becomes clear with the usual faint mucous cloud. The consistence is watery and the frothiness not permanent in health.

The first act of micturition may be delayed twenty-four hours, in which case the urine will be turbid and concentrated by absorption in the bladder. But if the urine be passed soon after birth, it will be clear and pale.

The urine of new-born children is light-colored, thin, limpid and of great mobility; to this rule, according to Parrot and Robin, there are three exceptions. First, urines opalescent at the moment of expulsion, but which, after standing some hours, become limpid again, depositing at the bottom of the vessel very delicate and scanty flocks, made up of the epithelium of the urinary passages and of the vulva in case of female children; second, urines light when passed and bleaching in from two to four hours, then becoming limpid again on deposit of the suspended matters causing the turbidity; these latter are bright crystals of uric acid formed at the moment when urine, neutral at first, has undergone acid fermentation. These two varieties of opalescence, observed especially during the first two or three days of life, are almost constant in children prematurely born. In the third case we find urines turbid when exposed to the

air for twenty-four hours or more, from development of micro-organisms.

Clinical Note.—In the great majority of cases, limpid, thin, colorless, inodorous urine of low specific gravity is found only among healthy new-born children.

UREA.—The amount of urea in 24 hours is best reckoned in grains per pound of body-weight, or grams per kilogram. The new-born infant up to one month of age voids about one and three-quarters grains of urea for each pound of body-weight, or 0.23 gram per kilogram. The following tables show the figures of the different authorities:

CAMERER.	HARLEY.
Children void 5 to 8½ grains for each pound of weight (0.64 to 1.12 grams per kilogram).	Boy of 18 months— 6.2 grains per pound. 0.4 grams per pound. 124 to 186 grains in 24 hours. 8 to 12 grams in 24 hours. Girl of 18 months— 5.4 grains per pound. 0.35 grams per pound. 93 to 140 grains in 24 hours. 6 to 9 grams in 24 hours.
RALFE.	UHLE.
4½ grains to the pound for a weight of 40 to 60 pounds. 4 grains to the pound for a weight of 60 to 120 pounds. Child of five of 40 pounds, 180 grains in 24 hours. Child of twelve of 80 pounds, 320 grains in 24 hours.	3 to 6 years—7½ grains per pound, 1 gram per kilogram. 8 to 11 years—6 grains per pound, 0.8 grams per kilogram. 13 to 16 years—3 to 4¾ grains per pound, 0.4 to 0.6 grams per kilogram.
HAIG.	
Child 3 or 4 years old, 9 or 10 grains per pound.	

The analyses of Parrot and Robin showed that urine contained, as a mean, 3.03 grams per liter of urea in children from a day to a month old, of an average weight of 3850 grams; hence, it results that every liter of such urine contains, per kilogram of child's weight, 0.80 gram of urea. A new-born child, which in twenty-four hours passes 300 grams of urine will then void 0.96 gram of urea, or 0.25 gram per kilogram of weight. But the age, weight, and bodily temperature modify in a very marked degree the quantity of urea. A new-born child passes more urea per liter and per kilogram of its weight on the first day of its life than on the twentieth, when the estimation per kilogram of weight is based on the urea per liter: but if the estimation per kilogram of weight

is based on the urea per twenty-four hours, it will be found, according to Parrot and Robin, that inasmuch as the twenty-four hours urine increases with age, the twenty-four hours urea increases also, and the urea per kilogram of weight also increases.

The tables quoted by Parrot and Robin are as follows:

PER LITER.

Age.	Mean weight of child.	Urea per liter of urine.	Urea per kilogram of child's weight.	Number of experiments.
	Grams.	*Grams.*		
First day	3725	7.05	1.89	3
Second day	3331	4.67	1.38	5
Third day	4117	4.38	1.05	3
Fourth day	3760	2.10	0.55	3
5th to 9th day	3559	1.70	0.47	8
Tenth day	3937	2.39	0.60	4
11th to 30th day	3560	2.73	0.76	16
30th to 150th day	4918	2.98	0.63	18

PER 24 HOURS.

Age.	Quantity of urine in 24 hours.	Quantity of urea in 24 hours.	Urea per kilogram of child.
	Grams.	*Grams.*	*Grams.*
First day	15	0.10	0.03
Second day	30	0.14	0.04
Third day	60	0.26	0.06
Fourth day	100	0.21	0.05
5th to 9th day	150	0.25	0.07
Tenth day	209	0.47	0.12
11th to 30th day	300	0.81	0.23
30th to 150th day	350	1.04	0.23

The apparent contradiction as regards urea per kilogram of child's weight is readily explained by considering the fact that the urea is reckoned differently in the two tables—in the first one relatively or physiologically, and in the second absolutely or clinically.

A heavy child is said to pass less urea per kilogram of body weight than one of less weight, but more per liter of urine.

According to Parrot and Robin, the more easily a new-born child is chilled the more urea per liter does the urine contain.

The quantity of urea is constantly diminished in the nephritis of children. It is also diminished in anemia and chlorosis.

Chlorine.—Children above three years of age void, according to Charles, 4.5 to 5.3 grams of chlorin, corresponding to 7 1-2 to 8 3-4 grams of chlorides (116 to 136 grains), in the twenty-four hours.

According to Parrot and Robin, in children from three to thirty days old, the general mean of chlorides was 0.79 gram per liter, or 0.22 per kilogram of body-weight. The chlorides estimated per liter of urine increased progressively from birth to the thirtieth day.

In the urine of the new-born Parrot and Robin, in fifteen cases, always found chlorides, but sometimes in such small proportion that to determine them exactly was impossible.

Sulphuric Acid.—The urine of the new-born contains sulphates, but, according to Parrot and Robin, in too slight proportions to allow determination of them by weight. Accurate analyses of the sulphates in the urine of children are difficult to obtain. The works thus far consulted by the writer throw little or no light on the subject, except that the substances have been found to be diminished in cases of nephritis in children.

Phosphoric Acid.—In the first eight days after birth, children excrete 0.014 to 0.032 per cent. phosphoric acid as compared with 0.19 to 0.23 per cent. in the adult. In young infants, the amount of earthy phosphates is very small. The proportion is much less in growing children than in adults.

According to Cruse, the phosphoric acid increases after the tenth day.

Von Jaksch, differing from other observers, has found that in some, though not all, cases of lobar pneumonia among children, the quantity of phosphoric acid eliminated during the continuance of fever was increased, as compared with the non-febrile period. He also finds phosphoric acid diminished in the urine of children suffering from nephritis.

According to Parrot and Robin, a new-born child passes per liter more phosphoric acid from the sixteenth to the thirtieth day than from the first to the fifteenth, and the maximal quantity which the urine may contain during that period in the case of health is 1.95 gram per liter or 0.47 gram per kilogram of body-weight.

Uric Acid.—In the new-born the quantity of uric acid is proportionally greater than in the adult, forming 0.13 per cent. during the first week, then decreasing up to 0.04, an adult secreting about 0.03 to 0.05 per cent. The ratio of urea to uric acic in the new-born, according to Marès, is about 1:13-14.

Ranke claims that neither age nor sex have any effect on the excretion of uric acid.

Saundly says the urine of the new-born contains much uric acid.

Haig affirms that, in a child of three or four years, uric acid per twenty-four hours may amount to as much as 0.27 to 0.30 grains per pound of body-weight.

Von Jaksch finds uric acid diminished in the urine of children suffering from nephritis.

Creatinin.—Infants on pure milk diet excrete little or no creatinin. Grocco finds very small quantities in the urine of babes on an exclusive milk diet. Boys ten to twelve years old excrete a mean of 0.387 gram (6 grains) in the twenty-four hours.

Meat diet considerably increases the creatinin even in young children.

Indican.—According to Hochsinger, indican is absent from the urine of the new-born and at best is only found in traces during the entire period of infancy; but is increased in gastro-enteritis and in cholera infantum. Excluding primary intestinal or general septic diseases, the presence of pathological quantities of indican is indicative of grave intestinal disturbance or grave general functional change, especially tuberculosis. Smith has found amorphous masses of indigo-blue in the urine of a child affected with digestive disturbance. At least once these amorphous masses were replaced by minute rhombic crystals of a blue color.

Urobilin.—A deep-brown zone of color, seen when Heller's cold nitric acid test, for albumen, is applied, and growing lighter as it recedes from the acid, is noticed in some cases of cirrhosis of the liver, and is regarded as an unfavorable sign. The same reaction is said to occur in cancer, lead-poisoning, alcoholic poisoning, rheumatism, gout, pneumonia, angina, and intermittent fever. It is considered by Hayene, a proof of hepatic incompetency, due to a languid liver manufacturing urobilin instead of normal bile-pigments.

Albumin.—Albumin may be found in the urine of children under the following circumstances:

1. Without known cause, so-called "functional" albuminuria.
2. In febrile states.
3. Due to presence of pus, blood, or chyle in the urine or found accompanying bile.
4. From pressure on renal veins by tumors, etc.
5. In nephritis.
6. In convulsions, epilepsy, etc.
7. In poisoning.

1. FUNCTIONAL ALBUMINURIA.

Functional albuminuria is more common in boys than in girls. The quantity of albumin may be very small or quite

large—as high as half by bulk. It is usually absent in the morning and present after food or exercise. No casts can be found, even after most careful search.

Albumin is found in the urine of infants before the urinary secretion has begun, and in that of weak and delicate children at puberty.

In regard to the prevalence of this form of albuminuria in children, the following may be of interest:

It was found in 38 out of 97 children examined by Capitan, in quantities varying from 0.007 to 0.02 gram per liter (0.0032 to 0.009 grain per ounce). Stewart found albumin in the urine of 17 out 100 healthy children. Stirling found albumin in 77 out of 369 healthy boys. Leroux found albuminuria in 5 per cent. of 330 presumably healthy children. Fürbringer found it in 11½ per cent. of 61 children. Janeway frequently finds albumin in the urine of debilitated children. De la Celle found albuminuria in 76 to 80 per. cent. of presumably healthy children from six to fifteen years of age, in quantities from 5 to 9 centigrams per liter.

2. ALBUMINURIA IN FEBRILE STATES.

Albuminuria of brief duration, and rarely of prognostic significance, is quite commonly found in the urine of measles, diphtheria and scarlet fever. Binet found albuminuria in all of 27 cases of pneumonia and broncho-pneumonia in children; Eckert found it very common in cases of typhus and typhoid fever, occurring in three-fourths of all children he examined, appearing most commonly in the first week, or even the first days of the affection, and lasting usually about one, or one and a half weeks, the quantity of albumin having close relation to the intensity of the attack.

Séjournet found albuminuria in children from fault of diet, the result of abnormal intestinal fermentations, and due to congestion of the kidneys. Such albuminuria evinced to some degree an infectious nature.

3. ALBUMIN IN THE URINE DUE TO PRESENCE OF PUS, BLOOD, OR CHYLE.

Urine of children containing pus will show albumin when the tests are applied. Pus in the urine may be due to gonorrhea, which may be found in female children as the result of rape or inoculation from parents; leucorrhea, which sometimes occurs in girls as young as three; cystitis (most commonly in children due to stone); pyelitis, suppurative nephritis, malignant disease, and tuberculosis. (See Pyuria.)

Urine of children containing blood will contain albumin also. (See Hematuria and Hemoglobinuria.)

When chyle is found in the urine, albumin also occurs. (See Chyle.)

4. ALBUMIN IN THE URINE DUE TO PRESSURE ON RENAL VEINS.

The tumors which by pressure on the renal veins cause albuminuria are, in the main, those of carcinomatous nature; sarcoma of the kidney has been noticed in children, also fibroma and rhabdomyoma. Tyson includes under this heading pressure from hydatid cysts. (See Cancer of the Kidney.)

5. ALBUMINURIA IN NEPHRITIS.

When albumin is found in the urine, together with casts and renal epithelium, the question is one which will be discussed under the head of nephritis, *q. v.*

6. ALBUMINURIA IN EPILEPSY.

Albumin has been found by Huppert in the urine after full-formed epileptic seizures for from three to four hours. Other observers have failed to find it; Mabille, for instance, in 38 cases, failed to find any either before, during, or after the seizure.

7. ALBUMINURIA IN POISONING.

Albuminuria is common in children who are taking arsenic in large doses, as in the treatment of chorea.

Peptone.—Binet found peptone in the urine of 34 infant patients out of 248. It occurs most frequently in diphtheria and in acute and chronic nephritis. He does not regard the symptom as of much value as a diagnostic and prognostic factor. Peptonuria is said to occur in some cases of diabetes insipidus.

Arslan, of Paris, as a result of experiments performed in the scarlatina wards of the Sick Children's Polyclinic, draws the following conclusions:

1. No peptone is found in the urine, in mild cases of simple scarlatina.

2. The urine contains peptone in grave cases of the disease associated with complications—the occurrence of the latter being even frequently preceded by peptonuria.

3. The presence of a considerable quantity of peptone in the urine is an unfavorable sign.

4. The peptonuria is in no way influenced by the presence of albumin, the condition of the pulse, or the temperature.

5. In grave cases of scarlet fever, and in those complicated with gastro-intestinal disturbances, indicanuria becomes superadded to peptonuria.

Propeptone.—Propeptone, according to Heller, may occur in scarlet fever, not only with albumin, but even when no evidence of renal disease is apparent. He does not regard it as unfavorable from a prognostic standpoint.

It may be well to remember that Von Köppen has noticed the existence of propeptone in the urine of the insane, especially of acute maniacal and excited cases.

Bile. — Bile may be found in the urine of children as in adults.

It is chiefly in cases of icterus neonatorum that we see it. In severe cases of icterus neonatorum, the urine is high-colored from bile pigment and stains the linen. Malarial and miasmatic poisons and phosphorus poisoning are sometimes causes of the condition in older children. Disappearance of biliary coloring matter from the urine is the first sign of improvement, and will be seen sometimes considerably before the jaundiced hue of the skin is lost. When bile is present in urine, albumin is also found in small amounts.

Sugar.—According to Neumann, there is found in all children's urine small quantities of a substance which reduces the alkaline copper test-liquid. This substance is especially noticeable in cases of severe nervous or digestive disorders. Sugar itself, however, in appreciable quantities is, as a rule, significant of diabetes, if found permanently in the urine of children. (See Diabetes.)

Acetone and Diacetic Acid.—Acetone is found in the urine of children under the following conditions:

1. In very small quantities in healthy children.

2. In febrile diseases of children, increasing with fever and diminishing with its decline.

3. In sudden epileptiform convulsions it is enormously increased in quantity, but cannot be regarded as the cause of eclamptic seizures in general.

4. In diabetes mellitus.

Schrack finds acetone in the urine of children not infrequently, especially in febrile affections and in acute gastro-intestinal derangements. It may, however, be absent even in high and continuous pyrexia. Diacetic acid he finds also quite frequently, and almost constantly in high and continued fever,

and quite commonly in the acute infectious processes, even if there be but little attendant fever, as is also the case with acetone.

Diacetic acid, according to Binet, occurs in the urine commonly in febrile diseases of children, but it is not found uniformly in all febrile conditions; it presents no definite relations to the intensity of the fever, the dyspnœa, nor digestive disorders. It is especially frequent in scarlet fever, and in some doubtful cases its presence and degree may be regarded as of some diagnostic value. Binet found it, using the ferric chloride reaction, in 10 cases out of 23 in pneumonia and bronchopneumonia; in 16 out of 26 of measles; in 27 out of 34 of scarlatina; in 4 out of 4 of erysipelas; in only 11 out of 31 in diphtheria; in 2 out of 4 of typhoid; in 2 out of 4 of tubercular meningitis; in 2 out of 15 of acute nephritis; in 2 out of 13 of various suppurative diseases (1 of bone tuberculosis and 1 of sub-diaphragmatic abscess).

Diacetemia is said by Von Jaksch to be much more frequent in children than in adults. The child feels weak, has a thickly-coated tongue, often slight conjunctival catarrh, sometimes vomiting, usually constipation, and very little or no fever. In two or three days all of these symptoms, together with the diaceturia, disappear. In other cases nervous symptoms are more marked. Von Jaksch believes that all of these, as well as a certain number of other convulsive attacks in children, are the result of anto-intoxication with diacetic acid.

Chyle.—Chyle has been found by Prout in the urine of a male infant 18 months old. In older children it often disappears after rest in bed. The condition is most common in the tropics.

In chyluria the urine is usually white and opaque, like milk; on standing awhile it sets spontaneously into a trembling coagulum, which after a time redissolves and breaks into flaky clots.

Myers, of Indiana, saw a case in which a child of eleven, female, had what was supposed to be sciataca for five years, until placing of a seton in the upper portion of the left thigh revealed presence of chyle in the leg. After a time the flow of chyle from the leg ceased and chylous urine appeared in large quantities.

Organic Acids.—Lactic, formic, acetic, and hippuric acid are said to be present in some cases of leukemia, but absent in others hence are of little or no diagnostic import.

Allantoin.—This substance is found in the urine of new-born children within the first eight days after birth.

Pyrocatechin.—This substance, called alkapton by Bodecker, has been found in abnormal quantity in the urine of a child. Urine containing it darkens on exposure to the air.

Urinary Sediments.—The urine of children suffering from febrile attacks often contains a milky-white sediment, due to presence of sodium urate, which under the microscope exhibits irregular, opaque, globular, and lumpy masses, from which project spiny crystals. These spiny crystals, being precipitated within the urinary passages, irritate the mucous membrane of the bladder or urethra, and may even block up the canal of the latter; they may also form a nucleus around which calculous matter may hereafter aggregate, since urates form the chief part of the nucleus in the majority of urinary calculi. The great comparative frequency of vesical calculi in children is not improbably owing to the occurrence of this deposit in the numerous fugitive febrile attacks to which children are subject.

This whitish sediment of urates is easily distinguished from phosphates, in that it is dissolved when heated in the urine containing it. It is not necessary to heat to boiling in order to dissolve it.

The urate sediment is common in fevers. An abundant sediment of urates may be found, for example, in scarlatina.

They are also found in the urine of chorea, and entero-colitis. Some children seem specially liable to these sediments, and appearance of them is accompanied by frequent desire to urinate; at the same time there is evidence of general disturbance, malaise, etc. Nux and calcarea will often be found useful in such cases.

Uric acid often occurs in the sediment of children's urine. (See Lithemia.) Its appearance to the naked eye is that of red-pepper grains.

In cases of flatulence, the urine may contain a whitish sediment of amorphous phosphates, readily soluble in nitric acid.

The urine of the new-born sometimes contains deposits of calcium oxalate, recognized as small, colorless crystals of a square letter-envelope appearance, seen best with a power of 400 to 500 diameters.*

According to Parrot and Robin, the presence of crystals in the urine of the new-born is one of the rarest of occurrences, and one which should always lead us to suspect a pathological condition, except in the first days following birth, after the urine, on standing, has undergone acid fermentation.

Xanthin.—Has been found in the urinary sediment of a ten-year-old child, who, three years before had had symptoms of renal colic. The crystals are whetstone-shaped and soluble

* See "Practitioner's Guide to Urinary Analysis," Gross and Delbridge, Chicago.

when the urine is heated. Xanthin calculi have been met with in children in several cases. (See Calculi.)

Leucin and tyrosin may be found in the urine of children in cases of acute yellow atrophy, a very rare disease in children.

Cystin.—Has been found in the sediment of children's urine, in some families occurring instead of uric acid. W. G. Smith, observed cystin in the urine of a boy of eight; the urine had an odor suggesting orris and the sediment was green in color. Making six examinations, he found cystin once. The child seemed to suffer no harm from its presence, not even for years.

Cystin has been found in a calculus removed from the bladder of a boy six and one-half years old. The urine prior to the operation was alkaline and contained much sodium chloride. Directly after the operation the urine became acid; but eight weeks later the alkaline reaction recurred again and cystin was recognized in the sediment. Cystin was found by Toel in the urine of two girls, partly in solution and partly as a sediment.

Fat in the Urine.—A case is recorded by Drecker in a female child of twenty-eight months. In the surface of the urine floated a layer of butter-like substance, which, on application of heat, appeared like ordinary fluid fat. The urine then became milky, and looked like thin milk-broth with fat floating on it. It had a peculiar aromatic odor, different from that developed ordinarily when urine is boiled. A drop on blotting paper made a greasy mark, not disappearing on drying. Heated with liquor potassæ it saponified. It also gave other proofs of being fat. It was present in 4.35 grams in every 100 C. C., or about 22 grains to the fluidounce. The child was dull, sleepy, very thirsty; perspiration had unpleasant odor; there was furred tongue and vomiting; five or six times daily a white, pap-like stool, with dark streaks through it, occurred; the face was swollen; there was ascites; there was tenderness over kidneys; skin dry, cool, and on upper arm finely desquamatory. No cause for the condition of the urine could be given. She had been very ill four months previous with catarrhal symptoms of lungs and stomach from which she had apparently recovered in three weeks.

Epithelia.—The various epithelia may be found in the urine of children as in adults. It is only when the sediment is very abundant, pointing to an exaggerated desquamatory condition, that our attention is called to the condition. According to Parrot and Robin, mucus or hyaline cylinders are not found at all in the urine of the new-born in the state of health. Epithelia from the bladder, urethra, and vagina, together with more rarely, those from the tubes of Bellini, are found in the urine of the new-born.

URINE OF THE NEW-BORN.

General Summary.—Parrot and Robin draw the following conclusions:

"1. The urine of the new-born child is colorless, inodorous, thin, of great refraction, clear and limpid, of a mean density of 1003–1004. The quantity passed in twenty-four hours, from the 6th to the 30th day, varies from 100 to 300 c. c.

"The morning emission is from 10 to 30 c. c. A new-born child urinates four times more than an adult for each kilogram of body-weight.

"2. During the first two days the urine is more colored, more scanty, more dense, and sometimes opalescent.

"It presents the same characteristics with children whose alimentation is defective. The sex, the age and the temperature do not exert any influence upon the physical characters.

"3. It is not sedimentous, but, on standing, it lets fall a very small quantity of anatomical elements, to wit: cells of the bladder, of the urethra, of the vagina, and more rarely, in the first days of life, cells detached from the tubes of Bellini.

"In circumstances, quite exceptional, the urine may give a very light deposit of uric acid crystals, or of oxalate of lime, or of urate of soda (the first day's urine—insufficient or vicious alimentation, etc.)

"Vegetable ferments appear to develop in it, more rapidly than in the urine of adults.

"4. The test paper shows an acid reaction. The acidity of the urine indicates, most usually, too long an interval between the nursings, and, in a certain number of cases, may indicate a pathological state.

"5. It contains, per liter, 3.03 grams of urea and 0.80 gram per kilogram from a child weighing 3,850 grams. But in the twenty-four hours, the new-born child, from 11 to 30 days old, passes about 0.91 gram of urea and 0.23 gram per kilogram of its weight.

"6. The age, the weight, and the temperature probably influence the quantity of urea; hence the urine of two children, whose age, weight, and temperature differ, present unequal quantities of urea; before explaining this difference by a pathological state, we must be sure that the excess of urea passes the limits which we have fixed for the variations due to these causes.

"7. There exists a constant relation between the quantity of urea, the color, and the reaction of the urine; so that the inspection of the urine and its reaction permit us to appre-

ciate, clinically, the proportion of urine without reagent or analysis.

"8. Traces of uric acid normally exist in the urine of new-born children, but their quantity cannot be determined. The urine of the first days contains more of this than subsequently.

"9. It does not contain extractive matters clinically appreciable, but it contains hippuric acid and allantoin.

"10. In no circumstance does the normal urine of the new-born, or of the fetus, contain albumin.

"11. Chlorides and phosphates are found in the urine, the quantities of which vary according to age and alimentation, also sulphates of lime, magnesia, potassa, and soda.

"12. It produces no reducing action upon the liquor of Barreswil (sugar test).

"13. The new-born ingests, in twenty-four hours, and per kilogram of his weight, twice as much nitrogen as the adult; he passes six times less by the urine, although he retains, at least, as much oxygen; hence he burns less while absorbing more of the combustible and, at least, as much of the burner.

"This excess of assimilation over disassimilation, experimentally demonstrated, is, in relation with the daily increase of weight, an augmentation in which a portion of the oxygen absorbed must take part.

"14. The new-born child excretes less chlorides than the adult, only because he takes in a much less quantity.

"15. The variations of urea, according to age, weight, and temperature, are easily explained by the modifications exerted upon the nutrition, by these influences.

"16. When the urine of a new-born child is modified, in one of its characteristics, beyond the limits which we have laid down, we may think, first, of an irregularity in the alimentation, then of a morbid state.

"17. Circumstances exist where, according to the mode of grouping the alterations of the urine, we may determine the existence of a special pathological state, or of a particular symptom (edema of the new-born, diarrhea, etc.).

"18. In other cases, the study of the urine allows us to foresee the near approach of particular accidents, such as edema, athrepsia, etc. In fact, a lesion of nutrition evidently precedes the appearance of external signs of these affections, and the child is already sick, even when no symptom outwardly reveals this state of suffering, the extent of which is shown by the alterations of the urine."

CHAPTER II.

THE URINE IN VARIOUS DISORDERS OF CHILDHOOD.

Masturbation in Female Children.—Dr. Charles Heitzmann, of New York, recently demonstrated to me the diagnosis of masturbation in female children by means of microscopical examination of the urine. The case was a child of nine years; the urine contained, in addition to the large epithelia from the upper layers of the vagina, connective tissue shreds, epithelia from middle layers of the vagina, epidermal scales from the nymphæ, fat granules of sebaceous origin (smegma) and Bartholinian epithelium. Heitzmann's diagnosis was intense vaginitis, vulvitis, and Bartholinitis due to rubbing. The child was watched by the parents and the diagnosis confirmed. Dr. Heitzmann tells me that arriving at a similar diagnosis in some five or six other cases, the children were watched and caught in the act in every case. The important point in the diagnosis is discovery of connective tissue shreds in the urine in female children not suffering from the other disorders in which connective tissue is regularly found.

Tetanus.—In tetanus we find diminished quantity of urine, of high color. There is difficult micturition and occasionally the catheter is required.

Fevers.—The twenty-four hours quantity is diminished and amorphous urates are deposited as the urine cools; if there is temporary retention of urine then the hedgehog crystals of sodium acid urate are found; during convalescence the sediment will contain simple phosphates and sometimes uric acid or calcium oxalate. A trace of albumin may be temporarily found during the febrile attack.

Typhoid Fever.—The features are as follows: There may be transient albuminuria, but casts are rarely found; the bacillus typhosus, if found at all, only occurs, it is said, in the sediment of albuminous urine. Retention of urine may occur and the catheter need to be used occasionally; if the catheter be not properly disinfected, urethritis, vesical catarrh, and even epididymitis may ensue. Polyuria in the course of tyhoid fever in children has been remarked.

Spinal Paralysis.—In the spinal paralysis of children, micturition is sometimes a little disturbed at the beginning of the

disease; but in most cases this disturbance completely disappears later.

Migraine.—In cases of persistent headache, look for constant or frequent appearance of urates, uric acid, and calcium oxalate; the latter, if found, point to uricemic (lithemic) origin of the headache. (See Uricemia.)

Whooping Cough.—Involuntary evacuations of urine sometimes occur in whooping cough, following violent contraction of the abdominal muscles.

Schiltema records a case of acute nephritis occurring after whooping cough in a child two years of age. Mircote declares that the kidneys are affected in whooping cough in about twelve per cent. of the cases, and believes that the renal affection is due to venous stasis, caused by obstruction of the vena cava through the violent paroxysms of coughing.

Diphtheria.— In simple or follicular sore throat, albumin rarely, if ever, occurs in the urine, while in diphtheria a trace of albumin is very common. A greater or less degree of albuminuria exists in most of the severe cases, usually when the disease is at its height, less often at a later period. A few casts may be found, but seldom much blood.

Bouchut and Erupis have found albuminuria in 66 per cent. of their cases. Sée in 50 per cent. of his, Barbier in 75 per cent., Sanné in 224 cases out of 410, and J. Lewis Smith in 24 out of 62 consecutive cases.

It may occur as early as the first day, though rarely, and a large majority of the recorded instances have been between the first and eleventh days. The urine differs in appearance from that of scarlet fever, by being apparently normal to the naked eye. It is sometimes present even in mild attacks of diphtheria.

As a rule, the albuminuria does not usually tend to a fatal result, but in severe cases, with other symptoms unfavorable, a large proportion of albumin, together with marked diminution of urine, constitute an unfavorable prognostic sign. In some cases, in a mild diphtheritic attack, urine may become scanty, highly albuminous, and death result. In some few cases blood may be found in the urine.

Capillary Bronchitis.—Simon recommends careful surveillance of the secretion of urine in the management of capillary bronchitis in infants. The suppression of urine may be the principal cause of dyspnea. If this occurs, he gives digitalis in 15 c. gm. (2¼ grains) doses of powdered leaves in infusion, three times in twenty-four hours. At the same time he places a cataplasm over the kidneys, and also uses dry cups. The cardiac contractions take on more regular rhythm and the urinary secretion is restored.

Measles.—Montefusco found the urine diminished, chlorides diminished, sulphates and phosphates sometimes increased in this disease.* Rarely was a trace of albumin found.

Loeb has found propeptone (hemialbumin) in the urine of 9 patients with measles out of 12, in which he examined the urine for it. The reaction was obtained, as a rule, for about two days at the beginning of the affection, after the temperature had begun to go down, but before the rash had disappeared. He suggests that perhaps the skin affection is connected with its formation. Nitric acid added cautiously to the urine, drop by drop, produces a white, flocculent precipitate dissolved by heat, but reappearing upon cooling, if propeptone is present.

Suppression of Urine.—Cases of suppression of urine in children occur, especially in connection with the acute nephritis of scarlet fever, or in scarlet-fever dropsy without albuminuria. Cases of complete suppression have been known to occur in children after catching cold. Overdoses of drugs, as cantharides, turpentine, lead, and irritants generally, may cause it through hyperemia of the kidneys. Roberts reports a case in connection with scarlet-fever dropsy without albumin, in which the child, seven years old, voided only two drachms in twenty-four hours; it was of a deep saffron color, highly concentrated; it contained no albumin, but casts were found. The total quantity of urine voided in the entire last seven days of life was but six or seven ounces.

Janeway saw one case after measles in which a child of seven passed but a quart of urine during an entire week, without albumin, blood, or casts, the specific gravity being 1030.

Eclampsia.—In eclampsia, Simon observes that the secretion of urine is entirely suspended, and subsequent discharge of it announces the approaching termination of the attack, or the end of a series of attacks.

Fibroid Contraction of the Kidneys.—Fibroid contraction of the kidneys was noticed by Fenwick in a case of a girl of nine years, who had been healthy until about seven and a half years of age, when she had an attack of measles and was never subsequently well. Six weeks before death she was passing 50 to 65 ounces of urine—specific gravity 1010 to 1012—with one fourth albumin and casts of various kinds. There was hypertrophy of the heart and high tension. Ophthalmoscope showed double neuritis. A fortnight before her admission to the hospital she had a severe fit, was universally convulsed, and lay unconscious for three days. When she recovered consciousness

* It is not stated whether the increase in these solids was relative or absolute; relative increase is probably meant.

she was practically blind, but partly recovered vision. She died three months after the first complaint of visual defect.

Dermoid Cyst.—Hair may be found in the urine coming from a dermoid cyst discharging into the urinary passages. Ralfe mentions a case in a child in which an apparent hernia was discovered, but was found to be irreducible. The child became ill and feverish, the urine cloudy and albuminous, and the swelling disappeared. Later the urine cleared up, and ceased to contain albumin, but an abundance of fine hair was passed with the urine. The hair, collected and examined, consisted of three varieties: (1) very fine, short, straight hair, closely matted together by a sticky, sebaceous substance, having somewhat the appearance of felt; (2) short, crisp, curly hairs, somewhat resembling wool; (3) some longer fibers, resembling in all respects human hair, colored either deep coal-black, or else bright vermilion-red, and from a quarter of an inch to two inches long. The discharge of hair caused the child no discomfort.

CHAPTER III.

ACUTE NEPHRITIS.

Definition and Synonyms.—Acute inflammation of the kidneys; acute Bright's disease. Under the head of acute nephritis are considered the various forms most common in childhood, as diffuse, exudative, etc.

Etiology.—Scarlatina is the most common cause of the acute (diffuse) nephritis in those under sixteen years of age. In some cases acute nephritis is primary in children. Acute nephritis may result from administration of poisons, or be secondary to a number of disorders, as diphtheria, small-pox, typhoid, etc. Acute nephritis (exudative) may occur as a complication, and not as a sequela, of scarlatina, diphtheria, and many infectious diseases. Acute nephritis in children may follow exposure to cold.

The scarlet fever nephritis is now regarded as chiefly microbic in origin, though it is claimed that exposure to cold will often induce an attack.

Rasch believes that the ear may sometimes be the focus from which the kidneys receive the infection, inasmuch as he found a case of otitis media acuta, which was followed by acute nephritis. He points to the necessity of examining the ears of small children when the origin of infection cannot be found elsewhere.

Pathology.—Cases of acute nephritis most commonly seen in childhood are post-scarlatinal. The tendency of modern investigations is to show that this disorder is a complex state of both tubal and interstitial change; hence the term acute *diffuse* nephritis.

Delafield distinguishes two forms, exudative and diffuse, the former essentially transitory, marked merely by exudation of the albuminous constituents of the blood; the latter by production of new connective tissue. Acute exudative nephritis is then not likely to become chronic, while diffuse nephritis proper is likely to persist. Clinically it is difficult to distinguish acute exudative nephritis from acute diffuse, except in cases of exudative where there is excessive production of pus in which certain symptoms are found. (See Symptoms.)

Symptoms.—The symptoms of post-scarlatinal nephritis are

usually the following: On the 14th, 20th, 21st, or 22d day after invasion of scarlet fever there is usually increased temperature, perhaps headache, pallor, vomiting, possibly convulsions; micturitions may be increased in frequency, and pain be felt in back and region of the bladder. Edema is present, first in tissues about inferior eyelids, then in lower extremities, upper extremities, until finally there is general anasarca. Drowsiness or stupor may be present. Cough, difficulty of breathing, intermittent pulse, together with scanty, bloody urine, highly albuminous and containing casts, complete the picture. Variations in the symptoms may be noticed; in some cases convulsions are the first symptoms, in others obstinate vomiting. Goodhart speaks of a case in which hematuria, scanty urine, and asthenia were the only symptoms. Delafield speaks of cases in which the urine contains pus (acute exudative nephritis, with much production of pus), in which dropsy is absent or very slight and the entire clinical picture is that of acute meningitis: marked fever and prostration, restlessness, sleeplessness, delirium, headache, stupor. The patients lose flesh and strength and pass into the typhoid state. When such symptoms are encountered following scarlet fever, they are highly suspicious; difficulty in establishing the diagnosis is encountered early in the disorder, when the urine may not be scanty nor contain albumin, casts, or blood; but later in the disease the last three may be found, though sometimes they are entirely absent. (In some cases no symptoms except the condition of the urine are noticed. Aldrich, of Minneapolis, saw a case following typhoid fever in which a boy of ten, during nine months of treatment, would not admit that he was sick, although during eight months of the time albumin averaged from a third to a sixth. Such cases are better regarded as sub-acute.)

Symptoms of acute primary nephritis are often misleading, inasmuch as there is no history of scarlatina to arouse our suspicions.

E. L. Holt speaks of a number of cases, in which the symptoms attracted attention to the brain or digestive system; there was fever, rapid pulse, peculiar respiration, and nervous symptoms. In two other cases, he found the predominating symptoms, continuous temperature of a high, remittent type, dullness, apathy, anemia, and mild gastro-intestinal symptoms without dropsy or suppression of urine. The last two cases lasted 17 and 22 days respectively and both died. The temperature ranged from 101° to 105°. Goodhart mentions a case not following scarlet fever, in which the symptoms were as follows: the child felt sick, had stomach-ache and was feverish. She afterward vomited repeatedly, was pale, drowsy, ashy in

appearance, with sub-normal temperature, cold extremities, and imperceptible pulse. The heart sounds were rapid and irregular. The urine contained one-tenth albumin and casts. Suppression of urine followed, continuing for many hours, and just before death she had convulsions. The disease lasted seven days.

Seyournet* has studied a type of albuminuria among children of the age of from eleven to sixteen months. A great many of the patients had been brought up on the bottle, having been fed on unsuitable food, causing distention of the abdomen or stomach, or occasionally enlargement of the liver, or intestinal disorders, accompanied by vomiting or diarrhea. He believes this special form of albuminuria to be of an infectious character, and traces it back pathogenetically to certain toxic substances, which are generated by abnormal fermentation in the bowels. These substances are absorbed by the bowels and pass to some extent into the kidneys. They produce congestion in the renal tissue, which may lead to inflammation of the kidneys. One of Dr. Seyournet's little patients had scarlet fever twenty-two days after convalescence from this albuminuria. It is evident from this fact, that it was not scarlatinal albuminuria. It was usually accompanied by anuria, whereby the congested condition of the kidneys was intensified. With some of the patients the daily evacuation of urine was only half an ounce. In one case the patient passed no urine for more than forty-eight hours. Notwithstanding this, no uremic symptoms appeared. It was in most cases only the anuria which led to the urine being examined for albumin. The result of the examination in in each case was positive. A strongly marked feature of this disease is the edema of the feet, sometimes also of the hands and of the eyelids and face, but the latter were not always affected. The quantity of albumin varied from a drachm to ten drachms per diem (60 to 160 grains, 4 to 40 grams). The duration of the disease was from two to four weeks. The treatment consisted in giving milk, which in some cases was mixed with lime-water. Systematic massage of the lumbar regions was also employed in order to relieve the congestion of the kidneys. Various drugs were also given.

Another case recorded by Goodhart, was that of a boy, who, after being weaned from the bottle, had intense thirst, but was otherwise thought to be well. At the age of three he had a sudden and severe attack of fever and vomiting, from which he recovered. After his recovery he had night terrors, and became subject to severe attacks of tetany and periodic attacks of

* The Lancet.

vomiting. His urine was always of low specific gravity and sometimes contained albumin and sometimes not. There were no casts; dropsy was absent. Once a month he would have a relapse, tetany reappearing, urine becoming scanty and loaded with albumin. He died in one of these attacks, comatose, and in a state of opisthotonos.

It may be remarked here that in all obscure diseases of children, in which intestinal disorders are prominent, the urine should be frequently examined.

An editorial in the *Hahnemannian*, 1893, p. 417, calls attention to the fact that albuminuria, without the well-known symptoms of Bright's disease, may occur in children. The younger the child, the less characteristic may be the symptoms. A simple high fever, or vomiting, purging, and collapse, or drowsiness and mild convulsive seizure, or simply anemia may be the symptoms. Nephritis, without apparent cause, and practically without indicating symptoms, may occur in children even as young as six months. The excellent practical suggestion is made that to collect the urine of infants for examination the child should be kept on pieces of well-boiled linen on a rubber pad for some hours, or on a sterilized silk sponge. Enough urine can be wrung out of these for purposes of examination. If retention be present, a small catheter may be used.

Moussous speaks of two children who had nephritis in the course of rheumatic purpura. The symptoms were articular pains, hemorrhages beneath the skin and from mucous membrane of the alimentary canal, pains in the back, edema, occasional hematuria, continuous albuminuria, and in one case hyaline and epithelial casts. One of the children died from asthenia, and the kidneys were like the large white kidney, only not enlarged. He regards the cases as chronic diffuse nephritis.

Hollopeter speaks of acute nephritis in a little boy, occurring after whooping cough. The child apparently recovered, when a relapse occurred and with it nephritis and uremia set in. There was edema of the lids and parts of the body, together with stupor. Recovery followed.

Longstreth describes the case of a colored boy of ten, picked up comatose in the street. His pupils were dilated. He complained only of abdominal pain, and had been busy running errands. Albumin and casts were found in his urine, and later he had more convulsions. No origin could be found for the case.

Course.—Scarlatinal nephritis varies greatly as to course: we may find cases which begin to improve a week or ten days

after they have begun ; or cases which, after progressing favorably, suddenly grow worse ; or cases which may be so violent in onset as to cause death in less than a day. Death occurs within the first eight or ten weeks usually ; after this time, if the patient lives, it is to be regarded as subacute or chronic, and may persist a number of years.

The following cases, which recovered completely from scarlatinal nephritis, illustrate the condition of the urine with reference to duration of the disorder.

Case 1. Boy. 14th of January urine was highly acid, contained moderate quantity of albumin, specific gravity 1026 ; sediment contained blood, pus, renal epithelium, hyaline, epithelial, blood, and finely granular casts, the latter not very numerous. After this analysis the case became serious, with scanty urine and threatened uremia ; but by March 13 not a trace of albumin nor any casts could be found, and the patient has been well ever since, now over a year.

Case 2. Girl, sister of case 1. January 23, blood, epithelial casts and considerable pus were found in the urine, albumin 1-20 of one per cent. by weight ; after this the patient grew worse, urine diminished to half a dozen ounces per diem. Recovery was slow ; on April 20 a trace of albumin could still be found and one or two casts. On June 3 a few granular casts. On June 28 no casts and a further analysis made December 15 showed the urine to be normal in all respects.

Prognosis.—The patient's chances for recovery from scarlatinal nephritis are two out of three ; but even in apparently favorable cases, relapses or heart failure may occur.

Relapses may occur any time, and are marked by increase of dropsy, decrease of urine per twenty-four hours, increase of hematuria and albuminuria. The danger now is from uremia, or pulmonary edema. Favorable signs are subsidence of hematuria, increase in quantity of urine per twenty-four hours, diminution in quantity of albumin and casts, lessening of dropsy. Signs of heart failure are sudden feebleness of the pulse, which becomes also irregular and sometimes slow. The respirations become rapid, extremities are cool, and death may result suddenly from collapse.

Treatment of Acute Nephritis.—1. Preventive.—It has been held that a milk diet throughout, in scarlet fever, with avoidance of exertion, and of taking cold, in the third week, is sufficient to prevent the onset of acute nephritis. If, however, at that time the temperature again rises and the urine begins to diminish, with headache, edema, etc., then

2. Hygienic.—Patient is to be put to bed, wearing woolen night-dress and wrapped in blankets. Jæger night-clothing and

bedding desirable. Patient to be sponged daily with tepid water containing a little alcohol; each part of the body to be rubbed dry, after sponging, before another part is wet. Room to be about 70° Fahr. in temperature. Thorough ventilation to be secured. Diet: if urine be suppressed or nearly so, arrow-root gruel for two days; then, if urine more abundant, milk in small quantity mixed with the gruel, rice in thin broth, plain rice pudding. In severe cases, no meat or fish for two weeks, and milk only in preparation of foods. Grapes, oranges, strawberries allowable. After the first day or two give pure spring water freely. Such waters as Poland, Bethesda, Clysmic desirable. Potatoes, especially sweet, allowable. When severe symptoms subside, exclusive milk diet. Try the entire milk, or if not borne, skimmed milk, a few ounces every two or three hours, lime-water and milk, milk of magnesia and milk. Or, if constipation, milk and Vichy, milk and carbonic water. Bear in mind also, peptonized milk, peptonized gruel and milk, peptonized milk toast. The milk diet should be continued for four weeks.

3. *Remedial.*—The remedies most often found useful are *merc. cor. terebinth. ferrum, digitalis* and *apium virus.*

The table on following page will serve as a help in differentiating:*

Searle thinks *merc. cor.* the main remedy for acute nephritis, alternating it with *aconite* or *ferrum phosphoricum*, and giving warm baths (98° to 100°), prolonged to half an hour or an hour. Woodward thinks *nitric acid* often serviceable, and a remedy which should not be forgotten. Gastro-intestinal symptoms, together with headache, are the chief indications for use of it.

Jousset† relies mainly on *belladonna, cantharis*, and *apium virus.* He thinks belladonna should be used in the beginning, when there is fever, headache, vomiting, together with scanty, bloody urine. He gives six drops of one of the first three dilutions in a glass of water, teaspoonful every two hours. Cantharis he uses after the beginning when there is no fever, or when belladonna has reduced the temperature in cases where the urine is highly albuminous, bloody, scanty, and passed with much tenesmus. Dose as of belladonna; in severe cases drop doses of the tincture three times daily.

Some clinicians advise *acidum carbolicum* and *kali bichromicum* in the earlier stages, following with *merc. cor.* or *merc. cyan.*, and using *apis* in the later stages. When serous effusions are evident, *arsenicum, bryonia, senega.*

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* Table X on page 124 of Mitchell's "Diseases of the Kidneys."

† Paper translated from the French by the writer of this article for the Columbian Exposition Congress, of 1893.

CHOICE OF LEADING REMEDIES IN ACUTE NEPHRITIS.*

Mercurius Cor.	Terebinth.	Ferrum.	Digitalis.	Apis.
Gastro-intestinal symptoms prominent early.	As in case of merc. cor.	As in case of merc. cor.	Not prominent and later.	Like digitalis.
Prostration and backache prominent early.	Not marked and not early.	Considerable pain and prostration.	Of little prominence till late.	Moderate only.
Chills or fever following gastric and hepatic symptoms.	High temperatures. Fever a prominent symptom.	Remittent type of fever following gastro-intestinal symptoms.	High temperatures and marked cardiac disturbances.	Chills and fever very prominent symptoms.
Edema not early nor prominent.	As in case of merc. cor.	Edema following gastro-intestinal symptoms.	Edema early and very prominent.	Edema, especially of face, early and prominent.
Dyspnea not early nor prominent.	Dyspnea marked and a prominent symptom.	Dyspnea not marked.	Dyspnea early and severe.	Dyspnea distressing.
Cerebral symptoms not marked.	Headache marked. Cerebral symptoms increasing rapidly in severity. Coma, delirium.	Cerebral symptoms not marked.	Cerebral symptoms not marked.	Headache severe and early.

*Based on suggestions from Prof. A. W. Woodward, M.D.

For the dropsy resisting apparently indicated homeopathic remedies, Tooker advises *diuretin*, which he has used successfully in a number of cases. Severe dropsy, coming on after the acute stage of nephritis, is often easily reduced by diuretin.* In cases of mitral insufficiency with insufficient compensation, digitalis is given first to reduce the compensatory disturbance, then diuretin is administered for the ascites, and anasarca. Children from two to five may take from eight to twenty-five grains a day; children from six to ten as much as from twenty-five to forty-five grains in divided doses. The total amount for the day may be dissolved in four ounces of warm water, with ten or twelve drops of brandy, and say forty grains of sugar. In some cases the drug has been given for weeks without signs of cumulative action or diminished therapeutic effect. As a rule, if in six days it has no effect, it is useless to continue it any longer.

Sambucus Nigra.—In full doses has been found to be a very prompt diuretec in acute nephritis with anasarca.

In the anemia following acute nephritis, there should be one meal a day of solid food, meat with bread and butter; during the rest of the twenty-four hours, milk. Bowels are to be opened daily by enema or simple laxative. Internally *ferrum*, supplemented by inhalations of oxygen gas. Boudreaux's syrup of the protochloride of iron is an excellent preparation. In the case of a child whose urine was brought to me for examination, complete cure was brought about by the use of Boudreaux's protochloride. The symptoms were dropsy, anemia, and albuminous urine, containing numerous hyaline casts.

If ferrum fails, recourse may be had to preparations of malt and cod-liver oil.

COMPLICATIONS OF ACUTE NEPHRITIS.

Uremia.—In the treatment of uremia, with convulsions impending or already present, application of a large hot poultice to the loins should be made and it should be changed every three hours. The wet pack may be used with advantage to promote sweating; a thin blanket is wrung out of hot water, and the naked child is wrapped in it from chin to feet; a dry blanket is then wrapped round it and loosely covered with a mackintosh. After an hour or so the wet pack is removed, and the child swathed in a dry blanket. The pack should not be continued for any excessive length of time. If necessary, the pack may be repeated at intervals of four to six hours.

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*Amer. Pract. and News.

Cupping the loins is recommended, but is not suited to the case of young children.

Purdy and others recommend blood-letting; "if the child be of robust constitution, and the symptoms do not yield to other measures, from two to six ounces of blood may be taken from the arm, often with the happiest results."*

When one convulsion follows another, or other of the lesser convulsive measures seem to threaten, Goodhart, instead of bleeding, prefers an ice-bag to the head and administration of chloroform, potassium bromide, and chloral hydrate, either by mouth or rectum. The benzoates may also be given internally to prevent recurrence of the convulsions.

The symptoms of uremia are usually diminution in quantity of urine, increased headache, twitching of some part of the face or extremities, or a general epileptiform convulsion, affecting the whole body. There may be but one attack, or one may be rapidly succeeded by others again and again, in which case there is much danger.

Searle speaks highly of lemon-juice in the treatment of uremia; half a pint in all in twenty-four hours, each dose mixed with water. Pilocarpin is regarded as a dangerous agent in the case of children.

Edema of the Tissues and Cavities.—Edema of the lung is a most serious complication. It often sets in rapidly; the physical signs are those of acute bronchitis, but the face is pallid or cyanotic, there is great dyspnea and distress, and the aspect of the patient is that of one not long to live. The bowels should be opened at once and such remedies as *digitalis, strophanthus*, etc., given. Stimulants, if necessary, as brandy, champagne, aromatic ammonia.

Hydrothorax occurs more slowly and is usually a part of the general filling up with water. It is a dangerous complication. *Arsenicum* is the principal remedy, together with general eliminative treatment. If any operation is to be performed, aspiration is the best for withdrawing the liquid.

Dropsies of serous cavities, in general, require *arsenicum;* paracentesis with a very fine canula is advised by Goodhart for abdominal dropsy, for relief of immediate symptoms. For *anasarca*, digitalis, strophanthus, caffein, the benzoates and diuretin are to be used first; the legs may be punctured (simple acupuncture). Bowels to be opened freely and baths given.

Vomiting.—Skimmed milk or iced Vichy, iced champagne. *Glonoin* is worth trying. Hot water will sometimes check the vomiting when other measures fail. *Kreasote* may be tried.

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* Purdy.

Vomiting, in cases where there is uremia, is often an effort of nature and should not be checked too suddenly.

Suppression of urine.—(See Uremia.) Give plenty of watery drinks, hot lemonade, cider, etc.

Cardiac Hypertrophy.— Symptoms: displacement of apex-beat, accentuation of second sound, increased dullness. *Digitalis* and *convallaria*, the latter in doses of 3 drops of the fluid extract.

Acute Dilatation of the Heart.—Irregular or halting action of the heart, frequent, thready, fluttering pulse, cold extremities, and frequent respirations are the symptoms. It is a very serious complication and likely to result in edema of the lungs. Length of the systole, want of sharpness, or shuffling quality may be noticed.

The remedies are *digitalis*, *strophanthus*, and *caffein*. Goodhart advises tincture of digitalis in four or five minim doses every three or four hours, continued for a day or two, then left off for a day or two, and begun again, if necessary; *digitalin* in doses of 1-120 of a grain may be given instead; strophanthus, in doses of from 2 to 5 minims of the tincture, or caffein, in doses of one or two grains, the latter together with sodium benzoate in water. He thinks *strychnin* in doses of 1-100 of a grain by subcutaneous injection one of the most valuable cardiac tonics that we possess.

Collapse, with slow pulse (65 or even 50), perhaps alarmingly irregular, rapid breathing, cool extremities, is an exceedingly grave complication. *Strophanthus* is probably the best remedy.

Diarrhea is a common complication and should rarely be checked completely unless there is great exhaustion, since elimination is promoted by it.

Acidity of the Urine.—In some cases, the highly acid urine favors blocking up of the convoluted tubules with colloid matter; for the purpose of diminishing the acidity, *lithia waters*, as Londonderry, Buffalo, or other well-known alkaline waters, may be given, or *lithium benzoate* in small doses, first decimal trituration; possibly grain doses of the *citrate of potash* dissolved in a moderate amount of water, and given every two to six hours.

Granular effervescent *citro-tartrate of sodium* may be given in five-grain doses in water.

SUBACUTE NEPHRITIS.

This disorder may be either idiopathic or a sequela of scarlatina and diphtheria. Whereas the duration of acute nephritis is about four weeks, eight to ten weeks at most, that of sub-

acute may be for months, or even years. The symptoms come on gradually and are chiefly the following: Anemia, dropsy, loss of strength, nausea, vomiting, diarrhea. The urine is not likely to be greatly diminished; it may even be increased, but the amount of solids as compared with that of the water deficient; *i. e.*, the quality of the urine is poor. The arteries are usually relaxed, but sometimes contracted; there may be inflammation of the retina. (Delafield.)

1. *Hygienic Treatment.*—Removal of patient to suitable warm climate, where out-of-door life is possible, as Southern California, the Bermudas, the Arkansas springs, Thomasville in Georgia, Tallahassee in Florida. High altitudes, rough ocean voyages and long railway journeys to be avoided.

If the patient reside in a cold climate, he must be kept indoors in stormy weather, and observe every precaution about catching cold; wear woolens, etc.; diet need not necessarily be limited to liquids, except in acute exacerbations. Patient may take as much solid food (of a non-nitrogenous character) and fats as he can digest. Excessive use of mineral waters of doubtful utility. The patient should void enough urine daily to excrete the normal amount of urea, and when dropsy is to be overcome, the amount of fluids taken by the patient should not exceed the amount of urine voided.*

The same general hygienic treatment pertains to protracted forms of acute nephritis. The patient may have to be kept in bed for a time, but should be given fresh air as soon as it is prudent.

2. *General Treatment.*—The patient's bowels should be kept in order and the skin moist and active. Massage is helpful, also inhalations of oxygen gas, when there is anemia. (See *Anemia* under Acute Nephritis.)

3. *Radical Treatment.*—The remedies especially adapted to the sub-acute form are *apis*, *digitalis*, *ferrum*, *mercurius cor.* Where apis is indicated, headache is particularly noticeable. (See indications already given in table.) Digitalis is useful when edema and dropsy, together with cardiac failure, are prominent early in the case. There is some nausea, but the pain in the back is but slight. Indications for ferrum have already been given, as have those for merc. cor. (See table.)

Boudreaux's iron is especially serviceable when ferrum is indicated. Ferrum phos. and the *lactate of iron* in the lower decimals are said from clinical experience to be useful.

For the high tension, *glonoin* is the remedy, given in the

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* Delafield *Med. Record*, March 23, 1889. In some cases no quantity of liquid ingested will bring up the urea to normal, and the patient will excrete more urea when voiding a smaller quantity of urine. See article by writer in *Hahnemannian* (1893).

third decimal or upwards according to age of the patient. Symptoms of high tension are incompressible pulse, fullness in the head, or bursting headache, etc. Glonoin in triturations has been found less likely to cause aggravation than in dilutions. For coma without increased tension *strophanthus, spartein*, etc., in small doses.

Prognosis.—Very few patients recover permanently. Some continue to get worse every way, and die within one or two years; some get better after a few months, then become ill again, and so go on for years.

Analysis of Urine.—The following is my analysis of the urine in the case of a boy of fifteen with subacute diffuse nephritis:

Ingredients	Grams per Liter	Grains per ounce	Grams per 24 hrs.	Grains per 24 hrs.
Urea	10	5	15	235
Albumin	6	3	9	140
Phosphoric Acid	0.8	0.4	1.2	18

Volume of Urine in 24 hrs. { 1500 cc. / 50 fl. oz.

Specific gravity 1012

Sediment.— Blood corpuscles; pus corpuscles; epithelium from convoluted tubules; hyalin, epithelial, granular, and fatty casts, together with a few waxy.

Patient anemic, confined to bed owing to loss of strength; edema of ankles and scrotum, face puffy, heart action at times irregular; otherwise no symptoms.

CHAPTER IV.

PYURIA AND HEMATURIA.

THE principal diseases of childhood in which pus, with or without blood, is found in the urine are the following: Suppurative nephritis, pyelitis, pyonephrosis, cystitis, calculous disease, tuberculosis, cancer.

When pus is found in the urine consult the table on page 452.*

If blood is a well-marked feature in the urine, consult also the following table:†

DIAGNOSIS IN HEMATURIA.

Blood from the kidneys.	Blood from the bladder.	Blood from the prostatic portion of the urethra.	Blood from the urethra.
Blood corpuscles spherical, small and brownish. Renal epithelium small roundish, one-third larger than pus corpuscles.	Blood corpuscles spherical, small, brownish, epithelium from bladder often large round (middle layers).	Blood corpuscles of normal disk-form, with central depression and reddish-yellow color.	Blood corpuscles like those from neck of the bladder (prostatic urethra).
Albumin more than blood accounts for.	Albumin less than blood accounts for.	Albumin less.	Albumin less.
Blood only during micturitions.	Blood only during micturitions. Urine more and more tinged as bladder empties itself.	Blood at the beginning of micturition. Sometimes a few drops at the end only.	Blood flows from meatus between micturitions, or may be squeezed out. Blood in the first glass only on micturition.
Urine may contain casts.	No casts.	No casts.	No casts.
Clots rounded, corresponding to diameter of ureter.	Clots very large and irregular in shape.	Clots leech-like, ovoid.	Long, bougie-like clots.

* Table X from Mitchell's "Diseases of the Kidneys."
† *Ibid.* Table XII.

PYURIA—DIFFERENTIAL DIAGNOSIS.

Suppuration in the kidney.	Suppuration in the kidney-pelvis.	Suppuration in the bladder.	Suppuration in the neck of bladder.	Suppuration in the urethra.
Marked chills, emaciation, gastric disturbances. If uremia present, it is of a typhoid kind, with dry tongue and feeble pulse.	Acute: febrile condition, pain in back. Chronic: course insidious, symptoms may not be marked.	Scalding urine, pain in passing water. Urine in both glasses equally turbid, last drops usually very turbid.	Micturitions frequent and painful at beginning and end. Urine in first glass more turbid than that of second.	Urine in first glass turbid, in second clear.
Pus sediment like that of pyelitis, if urine acid; hyaline and granular cast possibly found. If urine alkaline, sediment like that of cystitis. Epithelium from kidney (small round).	Pus sediment flocculent, not shreddy nor sticky in uncomplicated cases. Pus corpuscles small. Pus plugs seen with microscope. Epithelium from pelvis.	Pus sediment sticky, clings to the glass. Sediment contains triple phosphate, bladder epithelia, bacteria. Pus corpuscles swollen. Epithelium of bladder (middle layers).	Pus sediment shreddy, sometimes surmounted by blood. Shreds may be streaked with blood. Epithelium from middle layers bladder (large).	Pus oozes from meatus between micturitions.
Reaction first acid, later alkaline.	Reaction usually acid, may be alkaline if cystitis complicates.	Reaction usually alkaline.	Reaction usually acid.	Reaction usually acid.
Urine may contain more albumin than pus accounts for. (Not invariable.)	Urine may contain more albumin than pus accounts for. (Not invariable.)	Urine contains but little albumin and that due to pus. Ammonium carbonate abundant.	Urine may contain more albumin than pus accounts for.	Urine in first glass will respond to albumin tests.
24 hours' urine decreased in acute cases, greatly increased in chronic.	24 hours' urine decreased in acute cases, greatly increased in chronic.	24 hours' urine usually normal or not increased.	24 hours' urine usually decreased.	24 hours' urine not increased.

HEMATURIA: MISCELLANEOUS NOTES.

Oliver reports a case in which a girl of eleven, who had been exposed to possible infection from her brother ill with typhoid, was taken severely ill and for thirty-five days had hematuria, together with high temperature. Blood disappeared from the urine on the fall of the fever.

Sanford reports a case of possible malarial hematuria in a new-born infant, whose mother, a few days before confinement, had been treated for a mild attack of malarial fever. Hematuria continued for four days, disappearing with the temperature.

Moyer reports a case occurring in a child of five days without any appreciable cause. On the fifth day a slight icterus set in, unassociated with any disturbance of health; it disappeared in several days, the urine cleared up, and the child rapidly recovered.

Chevalier reports a case in a boy of eight years whose mother lived in Mauritius, where hematuria is endemic. Recovery took place after prolonged treatment.

HEMOGLOBINURIA.

Sanders, of Munich, reports a case in a child three days old; etiology uncertain. It was healthy up to the morning of the fourth day, when it became jaundiced, the urine highly stained, and death took place in a few hours.

Ballets reports a case of paroxysmal hemoglobinuria, in the course of severe jaundice in a child of eleven, pointing toward the hemoglobinemic theory as possibly caused in this case by a species of auto-intoxication.

Day reports a case of hemoglobinuria in a child, following a primary malarial paroxysm of the day previous. The stomach being unable to retain quinin, the drug was pushed by the rectum with success.

Hemoglobinuria may possibly result from infection; a child of two after ritual circumcision developed hemoglobinuria, became jaundiced, etc., and died.

Dr. Charles Heitzmann of New York demonstrated to the writer a case of hemoglobinuria dependent upon creosote poisoning. When the urine was fresh the odor of creosote could be made out, but after exposure to the air for a few hours the odor was not perceptible. The case occurred in an adult, but there is reason to suppose that it might occur in the case of children.

If, in addition to pyuria or hematuria, a tumor can be made out, consult the table on page 454.*

* *Ibid.* Table XIII.

DIFFERENTIAL DIAGNOSIS IN RENAL TUMORS.

Hydronephrosis.	Cancer.	Cystic Disease.	Pyonephrosis.	Perinephritic Abscess.
Tumor, unilateral or bilateral.	Unilateral.	Unilateral or bilateral.	Unilateral or bilateral.	Unilateral, rarely bilateral.
Fluctuant, as a rule, sometimes hard.	Non-fluctuant.	Non-fluctuant.	Fluctuant.	Fluctuant in time.
Irregular form.	Irregular form.	Shape of kidney.	Irregular form.	Irregular form.
Varies in size from time to time	No variation in size.	No variation; *hydatid cysts:* diminution in size of tumor after renal colic.	Varies in size.	No variation in size.
Painless or feeling of weight and dragging.	Severe and almost constant pain.	Usually painless until suppuration.	Considerable pain in lumbar region, worse on pressure in front, relieved by pressure behind.	Severe, lancinating, and increasing pain.
Hematuria rare.	Frequently recurring hematuria.	Hematuria moderate.	If due to renal calculus, hematuria after exercise.	When very large, blood and blood casts in urine.
Fluid pushes forward. Aspirated fluid, neutral or feebly acid, never alkaline.	Fluid accumulations push forward.	Fluids push forward. In hydatid cysts, aspirated fluid never acid, sometimes neutral, usually alkaline.	Fluids push forward. Aspirated fluid contains pus.	Fluid accumulation pushes backward.
Intermittent discharge of pale, watery urine.	Urine not intermittent.	Urine not intermittent.	Intermittent discharge of muco-purulent urine.	Urine not intermittent.
But little constitutional disturbance. No dropsy, no cachexia.	Eventually well-marked cachexia. Loss of flesh. Anemia. Ascites and edema lower extremities when pressure on abdominal veins.	Sallow complexion, hypertrophy of heart, arterial tension as in interstitial nephritis. Sometimes dropsy.	May be signs of uremic poisoning, but usually absence of marked fever.	Great constitutional disturbances; continuous elevation of temperature. Marked rigors and sweat.

If no tumor can be made out, and there is suspicion that the pelvis of the kidney is involved, study the following:*

DIFFERENTIAL DIAGNOSIS IN TUBERCULAR PYELITIS, CALCULOUS PYELITIS, AND RENAL CANCER.

Tuberculous Pyelitis.	Calculous Pyelitis.	Renal Cancer.
Pus in the urine abundant, early, and continuous. Great quantities of vibriones and micrococci.	Pus in the urine in small quantities at first, slowly increasing. Preceded by mucus.	Little or no pus or débris.
Hematuria not frequent, slight, and in night urine as well as day. Frequently absent for long intervals.	Occasional attacks of slight, sometimes severe, hematuria after exercise, none at night, or after repose.	Hematuria usually light at first, but later profuse. Spontaneous, continuous, aggravated at intervals; and both after repose and exercise. Hematuria may be absent in children.
Pain:—Greatest in the bladder, relieved when the bladder is empty.	Pain:—Paroxysmal and radiating. Worse on motion.	Pain not affected by movements.
Pyrexia, marked.	Pyrexia not marked.	Pyrexia not marked.
Emaciation, loss of appetite, etc.	General nutrition good.	Loss of flesh, anemia, cachexia.

* *Ibid.* Table XIV.

CHAPTER V.

CANCER IN THE URINARY TRACT.

Cancer of the Prostate.—Primary cancer of the prostate occurs chiefly in boys under ten and men over fifty. Engelbach found three cases in boys less than one year old. About seven-eighths of the tumors are carcinoma, the remainder sarcoma. In children the fatal termination is reached in a short time, in a few months at most. The most important diagnostic points, according to Belfield are: (1) Progessive emaciation and pallor; (2) Hard enlargement of lymph-glands in the groins, within the pelvis (detected by bimanual examination), and in Scarpa's triangle; (3) irregular, nodular enlargement of the prostate. If recognizable cancer tissue can be found in the urine, the evidence is complete.

The treatment should be directed to relief pain, cystitis, urinary retention, and rectal disturbance.

Tumors of the Bladder.—The bladder tumors most common in childhood are of the polypous form (myxoma). Out of eighty-nine cases of papilloma of the bladder, collected by Dr. F. S. Watson, only one case occurred in males between ten and twenty years of age, and one case (female) between one and two years of age. In 100 cases of cancer of the bladder, the youngest patient was thirty years of age. Of sarcoma of the bladder, in twenty cases five were under twenty years of age.

As to results of operation, Watson chronicles that in the case of two female children, each two years old, removal of benign growth (papilloma) resulted in death in both cases from exhaustion: one in six months, the other in sixteen.

Renal Cancer.—Primary cancer of the kidney is said to be more frequent during childhood than in adult life. Whenever, therefore, an abdominal distention is found in a child, cancer of the kidney should not be forgotten. Renal cancer grows rapidly, more so than cancer in any other part of the body. It is more common in males. Out of 123 cases of primary cancer of the kidney, 45 occurred in children under ten.

Hematuria is more frequently absent in children than in adults.

Enlarged masses of lymphatics in young children may be mistaken for renal cancer; but the latter is almost invariably

unilateral, while enlarged lymphatics are usually to be found on both sides of the abdomen.

Encephaloid cancer is by far the most frequent form ; sometimes tumors of a mixed character, weighing 25 or 30 lbs., have been met with even in young children.

Children under five are especially liable to renal cancer ; 22 out of 67 cases occurred at this period, and three others between seven and ten. Of the 25 cases mentioned two were one year old or less, six between one and two, six between two and three, eight between three and five, two between seven and eight, and one ten years old. Of 24 cases 15 were boys, and 9 girls. The etiology is obscure ; blows or falls are probably exciting causes only.

Roberts cites a case typical of infantile renal cancer in a boy six months old. When born, the nurse thought he had a full stomach. A fortnight old he had severe pain and flatulency, but was pretty well after it until three months old, when it was observed that his abdomen was larger than it ought to be, and it continued to enlarge. Early in life he had had frequent attacks of diarrhea, stools like "boiled moist cabbage ;" later, would go four or five days without evacuation, the motions being dry, hard, and yellow. Up to death he voided urine freely, and the latter was clear and free from blood. Appetite ravenous, and thirst intense. Ten weeks before death he was much emaciated, and the abdomen measured 21 inches over the umbilicus, with universal dullness on percussion, except in the left hypochondriac and hypogastric regions. The abdomen increased in size three inches in two months. The child died when seven and one-half months old. Hounsell gave Roberts notes of a case in a male child of four years. The boy had a large tumor in the umbilical, right hypochondriac, and lumbar regions. Its surface was dull on percussion, and the dullness was continuous with that of the liver. The child was sallow and emaciated. The tumor had been detected three months before death, and had grown rapidly. Hematuria had been noticed shortly before the discovery of the tumor, which involved the right kidney, and weighed nearly eleven pounds.

Sarcoma of the Kidney.—Dr. Charles Heitzmann, of New York, recently demonstrated to the writer, the diagnosis of small, round-celled sarcoma of one kidney, by means of microscopical examination of the urine. The patient was a child of six, and the diagnosis was confirmed by *post-mortem*. The urine contained the sarcoma corpuscles, which are midway in size between red-blood corpuscles and pus corpuscles ; in addition to sarcoma corpuscles, the urine contained shreds of fibrous connective tissue, large bunches of it being abundant. The points

in the diagnosis were, first, the sarcoma corpuscles, and second, the abundant connective tissue shreds. The locality of the tumor was decided by the relative abundance of epithelium from the convoluted tubules of the kidney. Uric acid crystals being present showed involvement of one kidney only.

The diagnosis of sarcoma microscopically by the urine is not possible unless ulceration of the tumor be present, which involves the presence both of red-blood corpuscles and shreds of connective tissue.

Sarcoma corpuscles are more granular than blood, and are without nucleus, or else are homogeneous.

Sarcoma of the kidney is more common in children than in adults, and is sometimes congenital. The symptoms are about the same as carcinoma, namely: rapidly growing tumor in the region of the kidneys, with recurring attacks of hematuria. In sarcoma there is probably less pain and more hemorrhage than in carcinoma. Twelve cases of sarcoma, in which striated muscular fibers were found, are recorded by Roberts, always in young children.

Prognosis and Treatment.—The prognosis is unfavorable and treatment wholly palliative. Nephrectomy is excluded in the case of children, as attention is not usually called to the disease until recognition of an abdominal tumor, removal of which does not remove the disease.

In the *American Practitioner and News* is an account of supposed sarcoma of the kidney, in a girl three years and ten months of age. She had been under observation but a short time and the history was uncertain. There were no symptoms referable to the growth, and as yet no impairment of nutrition. A large, firm mass could be felt in the left side of the abdomen just below the line of the umbilicus, and could be distinctly seen when the child was upon the back. Posteriorly it could be detected in the lumbar region, and upon making pressure forward the whole mass could be felt to move freely.

It was slightly nodular and hard and tense to the feel. It seemed to cause no discomfort or pain, and was not sensitive to pressure. The urine contained a few blood cells and broken, granular and hyalin casts. It was beyond doubt a kidney tumor, possibly a carcinoma. Carcinoma is, however, rare at this age, while sarcoma, if not common, is the most frequent kidney growth.

At the New York Pathological Society, Dr. L. Emmett Holt showed a specimen from a patient two years of age. A tumor had been discovered in the right side five months before. There was but little impairment of nutrition and no definite symptoms. A diagnosis of sarcoma had been made and con-

firmed by operation. The growth weighed two and a quarter pounds, and was removed by lumbar incision. One week after the operation the patient was doing well.

But one result could be expected in the first case without operation. The mass would increase in size and the child would waste and die.

HYDRONEPHROSIS.

Dumreicher, of Vienna, has reported a case of hydronephrosis in a girl of thirteen, the swelling in the abdomen dating from the tenth year. The tumor grew to enormous size, and to relieve dyspnea puncture was made and 18 quarts of a colloidal, brown-colored fluid removed.

In 13 out of 20 congenital cases mentioned by Roberts, the hydronephrosis was double. Two of these perished still-born, one lived six hours, one thirty, one thirty-six, while one died in twenty days, and another between three and four months after birth. One case mentioned by Hare lived thirty-eight years, and four other cases mentioned by Roberts lived from five and a half to twenty years.

Imperforate urethra is a cause of hydronephrosis in children; phimosis also. Congenital hydronephrosis is often associated with malformations of organs, as imperforate anus, harelip, club-foot, etc.

NOTES ON TUBERCULOSIS.

Among 315 tuberculosis children, Rilliet and Barthez found tubercle of the kidneys 49 times, or 15.7 per cent. From this it follows that the kidney is nearly three times more liable to deposits in tuberculosis children than in tuberculosis adults.

Renal tuberculosis may occur as young as three and a half years. Dillreth mentions four cases out of a total of 31, which were between birth and ten years of age, and five cases between ten and twenty.

Acute miliary tuberculosis is rather more frequently met in children than in adults, and the kidneys are less often invaded than the other organs. It usually invades both kidneys and is found in the cortex as miliary granulomata.

In boys we sometimes see tuberculosis of the vesical neck without any discoverable testicular involvement, but usually the latter is present. Tuberculosis in children does not cause enuresis, so far as known. Dysuria is a symptom of tuberculosis of the vesical neck, but irritability of the vesical neck is wanting. Evidence of involvement of the vesical neck is to be

found when there is neither polyuria or dysuria, by frequency of urination or a tendency to bleed on even the gentlest introduction of an instrument.

If even the fewest and smallest shot-like nodules can be felt in the testes, suspicion of tuberculosis of the vesical neck should be excited, and repeated examinations of the urine made for tubercle bacilli.

Bryson has seen six cases of tubercular nodules in the testes of young children which clearly dated from birth. In one case of a child of four, where no testicular involvement was discoverable, a tubercular cystitis was complicated by secondary (phosphatic) calculi.

SCROFULOUS KIDNEY.

At a recent meeting of the Manchester Pathological Society, Dr. Railton showed specimens from a case of scrofulous kidney in a boy, aged two years and nine months, who had been an in-patient at the Manchester Clinical Hospital. A tumor was observed on the left side of the abdomen, extending from the ribs to the iliac crest, and reaching as far forward as one finger's breadth in front of the vertical line of the anterior-superior iliac spine. There was no movement of the tumor during respiration, and the percussion note over it was dull. There was, in addition, some slight dullness over the apices of both lungs. One month after admission the child died of tuberculous meningitis. After death, the left kidney was found to be four or five times its normal size, and almost completely transformed into a caseous mass; its pelvis and calyces were dilated, and contained purulent fluid. The ureter was completely closed, accounting for the fact that the urine showed nothing abnormal. The apices of both lungs showed infiltration, caseation, calcification, while that of the right showed, in addition, a small cavity. The brain showed a considerable quantity of fluid in the ventricles, exuded lymph in the space between the optic chiasma and pons and along the sylvian fissures, tubercles on the lower surface of the lateral lobes of the cerebellum and in the longitudinal fissure. Dr. Railton remarked that the disease in the left kidney had probably existed for a long time before that in the lungs, and had no causal relation to it, and that the meningeal tuberculosis was of quite recent date. He asked whether some distinction should not be drawn between a slow caseating process like that in the kidney of this case, or as frequently witnessed in tumors of the cerebellum, and the rapidly disseminating process known as acute tuberculosis.

Dr. Dreschfeld said that he would have expected to find, from Dr. Railton's description of the *ante-mortem* appearances, the kidney much larger than it turned out to be, but had often noticed similar discrepancies in other abdominal tumors. He did not consider that any real difference existed between this class of case and ordinary tuberculosis. The presence of bacilli in the urine would be conclusive evidence in a similar case, but in this the blocking of the ureter rendered such appearance impossible.

CHAPTER VI.

CALCULUS IN THE URINARY PASSAGES.

Etiology and Pathology.—In infancy and in adolescence oxalate of lime calculus predominates, associated with carbonate of lime. Children of gouty parents are themselves subjects of gravel.

The deposition of clumps of urate of soda in the urinary passages is not uncommon in the febrile attacks of infants and younger children; it seems fairly probable that some of these clumps may be retained, either in the kidney-pelvis or in the bladder, and become the nuclei of future calculi; hence, perhaps, the excessive frequency of calculi in children.

The most frequent calculus in young children, then, is the urate, mixed with uric acid. The color is light fawn or grayish-yellow. Infarcts of urates are found sometimes in the renal tubes of young infants, and consist of irregular masses of ammonium and sodium urate, forming yellow-red lines, radiating from the papilla to the basis of the pyramids. They are not found in the kidneys of still-born children, but usually occur from the second to the nineteenth day after birth, and in some instances, as late as three or four months. They are generally regarded as physiological rather than pathological.

The frequency of stone in the bladder is far the greatest under five years of age, and next, between ten and fifteen. Thompson's statistics show that of 1827 persons, who underwent lithotomy in England, 473 were under five years and 528 between five and fifteen.

Stone is said to be more common among the children of the poor than in those of the rich.

Symptoms.—In young children, prolapsus ani, priapism, and bloody urine are signs of calculus disease. If the stream of urine is abruptly checked, suspect stone in the bladder or deep urethra. Retention of urine in a child often means a concretion impacted in the urethra. Examine the napkins in suspected cases for reddish-brown stains, or in older children, the urine, for evidences of uricemia, oxaluria, or phosphaturia. If the calculus is deposited in the kidney, there will be occasional attacks of slight, sometimes severe, hematuria after exercise, but little or none at night or after repose; pain is worse on motion;

the urine may contain pus, in small quantities at first, slowly increasing.

Prognosis and Treatment. — In uric-acid calculus (renal) the prognosis, as a rule, is favorable. The treatment consists of copious drinks, warm baths, non-nitrogenous diet, and crude drugs, as *sodium phosphate* and *benzoates* in small doses.

If the stone be in the bladder, and from the sediment is evidently uric acid or urates, and not oxalate or unknown, Roberts believes in trying solvent treatment, recommending 20 grains of *citrate of potassium* in three ounces of water every three hours, raising it soon to 25 grains, and after two months to 30 grains. He has tried solvent treatment successfully in three cases of calculus of the bladder in children from four to twelve years of age, and makes the deduction that a continuously alkaline state of the urine does not determine any precipitation of the earthy phosphates on the stone, so long as the urine is free from ammoniacal decomposition.

Miscellaneous Notes.—Hance has recorded the accidental discovery of an oxalate-of-lime calculus in the body of an infant aged twenty months, who had died of pulmonary tuberculosis and whooping cough.

Duret removed a vesical calculus weighing two ounces (60 gm.) from the bladder of a child of six years. The stone was the size of a mandarin, smooth, with a center of brown surrounded by concentric layers of white.

Langenbeck removed a xanthin calculus, size of a small egg, from a boy of eight.

Taylor saw a xanthin stone weighing a quarter of an ounce taken from a child of four.

Dulk removed a xanthin calculus weighing seven grains from the urethra of a boy.

CHAPTER VII.

URICEMIA.

Synonyms and Definition.—The synonyms are lithemia, uric-acidemia, uric-acid diathesis, lithic-acid diathesis, lithuria. Disease in which the blood contains excess of uric acid, or in which the latter, being imperfectly eliminated, accumulates in the system.

Etiology.—Heredity and digestive disorders are the usual causes to which uricemia is referable. In children, uric acid, gravel or calculus, is frequently the result of debilitating illness, and from the very highly acid urine secreted by them under very slight disturbing influence. (Ralfe.)

Pathology.—We do not know how or where uric acid is produced in the body. In some cases there are deposits of uric acid or urates in the urine, without increase of total uric acid in the urine, and again the total uric acid may be in excess in the urine without deposits of uric acid or urates. Haig thinks changes in elimination, rather than in formation, responsible for the various clinical phenomena.

Retention, for example, of uric acid in the system, is responsible for certain pains, while large excretion, by increasing arterial tension, causes others.

Symptoms.—According to Sutherland the symptoms of uricemia in children are of two classes: those due to presence of uric acid in the system, and those due to excretion of uric acid from the system. Symptoms due to the presence of uric acid in the system are as follows: The children have keen, precocious minds, small restless bodies, and are excitable and nervous. They are bright and amusing at one time, greatly depressed at another. They do not readily fall asleep at night, often talk in their sleep, wake early in the morning, are dainty feeders and like everything that is bad for nutrition; are very subject to colds, and a chill in some form or other is the precursor of an acute attack. They sweat profusely on moderate heat or exertion and have cold hands and feet. The acute attacks are usually short, especially if the child is kept in bed, and are prone to recurrence; during them the pharynx is relaxed and irritable, causing a loud, barking cough most marked when the child goes to bed, and possibly accompanied by some bronchial

inflammation. The tonsils and adenoid tissue of the naso-pharynx are liable to acute attacks leading to chronic thickening and enlargement. There is frontal headache and symptoms of intestinal catarrh with furred tongue and foul breath. Slight irregularity of the heart occurs usually and the pulse is often small, weak, and irregular. The liver and spleen may be enlarged. In some cases abdominal pain is the only complaint, and this is sometimes found to be localized in the right iliac fossa.

The symptoms due to excretion of uric acid from the system are the following: Pain is prominent; renal colic may occur and pass for "stomach-ache." The pain may be present in any part of the urinary tract from the kidney downwards, is intermittent in character, and often so intense as to cause the child to cry out, especially in the middle of the night. Renal hematuria is frequently the first symptom and there may be more or less shivering, nausea, and sickness present during an attack. The pain is supra-pubic if the bladder is affected, and extends along the urethra to the meatus. The pain is often brought on by walking, and is increased during micturition, so that the urine is retained for a considerable period. Henoch, according to Sutherland, describes a case of convulsions, in a child five months old, due to reflex irritation from extreme dysuria, accompanied by passage of large uric acid crystals.

As the kidneys are believed to secrete the uric acid from the blood, it is probable that great irritation may be caused in the tubules by the mechanical contact with the sharp particles. These may soon combine with the bases in the urine, are thus rendered non-irritant, and may be excreted without producing any disturbance in the urinary tract. Should the urine, however, contain only a small amount of these bases, or should the passage of the uric acid through the tubules be hastened, pain will probably be present, and this is what we find, for example, in the screaming at night, when the urine is most acid, and in the pain caused by walking, when both from the vascular and muscular pressure, the kidneys are emptied of their contents more rapidly.

The greater the proportion of solid to fluid constituents of the urine, the more marked will the pain be, while, if the watery constituents are abundant, pain will probably be entirely absent. It is a marked feature in the subjects of this diathesis that they drink in moderation, while they sweat profusely on slight exertion, with the result that the amount of urine passed is small. Many cases of intractable incontinuence are due to inflammation of the bladder, which is induced and kept up by the excessive acidity of the urine. Rectal pain, incontinuence

of the feces, pain during defecation, prolapse of the rectum, and irregularity of the bowels will often be cured by directing the treatment solely to the condition of the bladder and urine. This may be confirmed on rectal examination by the tenderness which is found on pressing forwards over the lower part of the bladder. Albuminuria is not infrequent, with or without hematuria, and is produced, like the latter, by mechanical irritation in the kidneys. The amount of albumin may vary from the merest trace up to one-half (on boiling), and tube casts may be present, usually fewer in number and of a more limited variety than in albuminuria from organic structural disease of the kidneys. A catarrhal inflammation in the pelvis of the kidney, or about the neck of the bladder, is manifested by the appearance of pus cells and epithelial scales in the urine. Dr. Milner Fothergill says that, "A large deposit of urates is a storm signal," and these storm signals are of great use in this latent disease. In a case of that of a little girl, aged ten years, who was apparently in good health, but whose urine contained urates and uric acid in such abundance as to attract special attention. This was soon followed by an attack of tonsilitis, pericarditis with delirium, endocarditis, and very severe chorea. Most of the above symptoms are illustrated in the accompanying cases. There are some others in which the connection with uric acid may not be so readily admitted.*

Inasmuch as children in twenty-four hours excrete more uric acid per pound of weight than adults, they are thus by nature placed, as Haig observes, much in the position of an adult who eats largely of meat, hence are liable to uric-acidemia. The symptoms are gastro-intestinal disturbance, loss of appetite, headache, and slow pulse.

Children fed on meat and meat extracts, often suffer from gastro-intestinal derangements, skin diseases, and early migraine; in these patients rheumatism and its most serious manifestations should be expected early. Haig mentions a case of hemoglobinuria, in which a child, aged four years and ten months, was subject to attacks of cold and shivering, during which he passed high-colored urine. Before each attack he felt more than usually well, but his bowels were constipated; just before the attack he yawned a great deal, his pulse was slow, and he complained of headache. Haig thinks, in this case, that the blood in the urine was due to a uric acid storm.

In general, when children present a number of vague and anomalous symptoms, uricemia may be suspected and the urine

* Southerland, *British Med. Journal*, 1892.

should be examined. According to some authorities, 30 per cent. of all children, and especially those at school, have neurasthenia, and other incomplete expressions of defective metabolic action.

In cases of colic, examine the napkins of young children for reddish-brown stains, and look for prolapsus ani, priapism, and bloody urine as signs of calculous disease. If the stream of urine is abruptly checked, suspect stone in the bladder or deep urethra. Retention of urine in a child often means a concretion impacted in the urethra.

The Urine in Uricemia.—The urine may be clear when voided, but soon becomes thick and opaque, or covered with a delicate film or pellicle, exhibiting faintly a play of prismatic colors; or in a few hours their is seen in the sediment a deposit of free uric acid—"red pepper" crystals. The chamber vessel in such cases becomes covered with a slimy pinkish coating, difficult to remove.

In some cases the above condition may be absent; if quantitative analysis of the urine shows deficient elimination of uric acid, especially if there is increase in the urea-uric acid ratio, while at the same time the symptoms described above as due to uric acid in the system are present, the condition may yet be one of uricemia.

What the normal urea-uric acid ratio may be is difficult to determine, as we yet have no method for the quantitative estimation of uric acid which is not open to criticism. Haig, using Haycraft's method, asserts that it is 33 to 1; Yvon-Berlioz put it at 40 to 1; Parkes at 60 to 1; Olof Hammarsten from 50 to 1, to 70 to 1. In new-born infants, and in the first days of life, Marès puts it at about 13–14 to 1.

Treatment.—Speaking of the treatment of uricemia headache, E. C. Seguin makes the following sensible suggestions; which apply to uricemia in general.

"The diet should consist of a minimum of sweet and starchy foods, a moderate amount of meat, an abundance of green vegetables, milk, eggs, poultry, and fish. There should be regular exercise in addition to play. Cold baths or sponges may be taken. The patient is to have plenty of sleep and plenty of water, especially at meals, as, for example, the mild lithia waters."

In my opinion, this is the best general régime for uricemia which has been published. I lay especial stress on the importance of allowing the uricemic child plenty of sleep. For some reason not altogether plain, sleep is apparently one of the best "antidotes" to the uric acid poison which there is. Rousing a uricemic patient before he has completed his full

quota of sleep is an act of cruelty. The worst cases of uricemia are those in which insomnia is established, for sleep, and plenty of it, is the great desideratum in treatment.

Copious drinks, and in some cases warm baths, are advisable. There are, however, some uricemic children who do not take kindly to too frequent baths of any kind, and become wakeful and restless if the latter be taken at night.

Remedies.—In the case of children the leading remedies are *nux vomica*, *calcarea carbonica*, and *lycopodium*. Bryonia, podophyllum, arsenicum, belladonna, cantharis are also needed at times. If the case is one of gravel or calculus, *berberis*, *uva ursi*, etc.

When the urine is deficient in water, the solids being relatively in excess, color high, red sandy sediment of uric acid and urates, or whitish sediment of urates mixed with pus and mucus, possibly even blood, together with dull pains in the kidney, relieved by voiding urine, lycopodium is the remedy;* nux vomica when disturbances of digestion are the root of the evil, and calcarea carbonica in typical subjects. In one case nux vomica 3x, alternated with calc. carb. 6x, gave marked benefit in a short time.

If there is much blood in the urine *thlaspi* should be tried (tincture, 15 to 30 drop doses).

As to the use of lithia waters, the following may be said: In some cases while they diminish alkalinity temporarily, the urine may become later more acid than ever. In which case copious draughts of pure spring water are better.

The following case of uricemia has come under the writer's treatment: Girl, four years of age, light complexion, restless, nervous; is somewhat puffy under the eyes, much irritation of genitals with prolapse of labial folds, brick-dust sediment in the urine; urine scanty, urea 13½ grains to the ounce (28 grams per liter), phosphoric acid 1 grain to the ounce (2.3 grams per liter), albumin faint trace, acidity increased, sediment contains urates and uric acid. *Lithium benzoate*, third decimal trituration, was given four times daily with benefit. Removal to the fresh air of the country restored patient to health. After returning to the city the urine after a time began to show much uric acid again on the advent of digestive disturbances. *Nux* 3x and *calc. carb.* 6x were then given and with beneficial results.

Miscellaneous Notes.—Haig saw a case of splenic leucocythemia in a boy, aged ten. Examination of the urine revealed the ratio of uric acid to urea to be 1 to 13.8 instead of 1 to 33,

* H. N. Lyon, *Medical Visitor*, 1890.

the normal. The child was put on a mixture containing dilute *nitro-hydrochloric acid* three times a day before meals and another mixture containing *salicylate of sodium* gr. x and *Sp. Am. Arom.* m. xv three times a day after meals, with immediate improvement and rapid recovery.

In two cases of Raynaud's disease in children, Haig found the ratio of uric acid to urea to be enormous, sometimes as high as 1 to 8.3. Under *nitro-glycerin* the patients improved and the uric-acid urea ratio fell to as low as 1 to 53 in one case.

In the case of children of markedly gouty and rheumatic families, or of those in whose families bilious attacks, headaches, or epilepsy are prominent, Haig thinks a decided reduction of the animal nitrogen in their food is strongly indicated as a prophylactic measure.

Seguin recommends dilute *nitro-muriatic acid*, 3 to 10 drops in a tumbler of water after meals. Strong alkalies or lemon juice, if used, should be given three or four hours after meals.

CHAPTER VIII.

DIABETES MELLITUS.

Definition.—Diabetes mellitus is a disease characterized by persistent presence of sugar in the urine, together with polyuria.

Etiology.—Heredity and especially a phthisical history. Next to heredity, previously existing diseases, notably gastric catarrh. Diabetes mellitus in children has been known to follow typhoid fever and purpura hemorrhagica. Over-exertion, profuse perspiration, and cold are said to have caused at least one case; falls and blows on the head are etiological factors; also daily exposure to wet and cold, and cold baths.

Transient glycosuria in children has succeeded malarial disease, measles, immoderate eating of saccharine matters and even fatty substances, as well as indiscriminate eating, with daily exposure to wet and cold. (Stern.)

Dr. John A. Larrabee thinks it can be shown that diabetes is connected with inherited neurotic tendencies. Epileptic, and nervous, hysterical parents often leave this legacy to their children. In his opinion, the *fons et origo mali* is a changed polarity of the nervous system in the medulla, without observable lesion.

Schnée thinks diabetes intimately connected with syphilis; he speaks of making the following "discovery:" "Diabetes is an hereditary, constitutional disease; and the etiological element of this disease is lues contracted by some ancestor."

Kühl's observations on diabetes in children are that the influence of heredity is as follows: parents of diabetic children either have diabetes or some nervous malady. He regards traumatism as one of the causes. He finds that mild cases may become severe more quickly under the influence of traumatism.

Loomis mentions a case in a female child twelve years of age, who, after fourteen months' illness from Bright's disease, eighteen months subsequent to scarlet fever, suddenly died of diabetic coma.

Age.—Out of 117 cases in children, Stern found 6 under one year of age, 1 seemingly born with it; 7 over one year; 3 over two years; 7 over three years; 6 over four years; 5 over five years; 1 over six years; 6 over seven years; two had completed

eight years; 8 were nine years old; 6 were ten; 9 were eleven; 8 were twelve; 9 were thirteen; 5 were fourteen; 4 were fifteen; 28, age not given. They were all of the better class and only one Jewish.

Out of 618 cases of all ages, W. J. Scott found only 4 under ten years. One was fourteen months.

Out of 140 diabetic cases of all ages, Seegen found none between the ages of one and ten, and but 5 between eleven and twenty.

Out of 380 cases of all ages, Mayer found but 1 case under ten years of age, and 4 between ten and twenty.

Nagle, quoted by Fowler, reports 4 deaths from diabetes mellitus in children under five years, in the years 1878 to 1887 inclusive, in New York City, population 1,400,000; 29 deaths between five and twenty years.

Prout, out of 700 cases, saw only one in a child of five, and about a dozen between eight and twenty years.

According to Roberts, diabetes is rare under five years of age. In the reports of the British Registrar-general from 1851 to 1860, ten deaths from diabetes in children under one year of age are registered in England and Wales, with a population of 19,000,000, and 32 under three years of age.

West saw only one case at three and a-half years.

Schmitz, out of 2115 cases of diabetes, saw 85 under twenty years of age. Ten were from one to ten years old, and 75 were from ten to twenty years old. Hereditary predisposition, he found in 998 cases, and he has seen five, six, up to eight or ten, and even twelve cases in one family. In some cases the predisposition was congenital, but not hereditary, brothers or sisters being diabetic.

Isenflam saw a family in which eight children of healthy parents all died of diabetes after reaching their eighth year.

Sex.—Female children are more susceptible to the disease than males.*

Out of 78 cases, Stern found 47 females and 31 males. Simpson says that the proportion of males to females varies distinctly with age, being about equal up to ten years, and from that up it is more frequent in the male.

Pathology.—No constant lesion has been found which distinguishes diabetes mellitus. Pavy's idea is, that the whole trouble is due to imperfect de-arterialized venous blood, consequent upon vaso-motor paralysis, especially of the vessels of the chylo-poietic system. Modern research has shown that in some cases there is lesion of the pancreas. Larrabee's opinion is,

* Kühl.

that there is changed polarity of the nervous system in the medulla, without observable lesion.

Symptoms and Complications.—Diabetes sometimes manifests itself in children by wetting of the bed, and in all children in which this symptom is noticed it is prudent to examine the urine for sugar. In sucking babes, loss of flesh is sometimes the first noticeable symptom.

The usual symptoms are persistent glycosuria, polyuria, polydipsia; hunger, which may sometimes be ravenous, and emaciation.

Complications of diabetes are coma, albuminuria, phlegmonous and gangrenous processes, erysipelas, pruritus, eczema, disturbances of sight, cystitis, and various other disorders.

Fichtner saw a case in a girl of ten years, among whose symptoms were abolition of knee-reflex and diffuse retinitis. (Acetone was found in the urine, but not oxybutyric acid.)

According to Litten, sudden blindness in young diabetics sometimes occurs. There is no affection in which disturbances of sight are so frequently met as in diabetes. All the ocular tissues, *viz.*, the cornea, iris, crystalline lens, vitreous humor, retina, muscles, etc., may be affected, but changes in the crystalline lens are the most common of the ocular manifestations of diabetes.

The causes of diabetic cataract are but little known. According to Seegen, it is to be attributed to the presence of exaggerated glycosuria and diabetic cachexia, and is always bilateral.

Seegen's explanation holds good only in young patients under twenty years of age, seeing that in old people diabetic cataract is often unilateral, while it may be associated with but moderate glycosuria.

In two cases under Litten's observation, cataract developed with amazing rapidity, the evolution being complete in the space of a few hours.

The first patient was a girl, aged seventeen, in a cachectic condition, excreting about twelve ounces of sugar in the twenty-four hours. There was complete loss of sight on the right and imperfect vision on the left side. She was operated on by Dr. Hirschfeld, the lens being dislocated in the anterior chambers, where it was rapidly absorbed. The patient's sight has considerably improved since.

The second case was identical with the one just described. No operation was performed, and the patient is now absolutely blind.

Death has been known to follow operation for double cataract in a diabetic child.

Diabetic Coma.—Coma is more common in children than in adults, and sudden deaths from it have been noted. Early recognition of diabetic coma is very difficult and in some cases impossible, but it may be said in general that any sudden improvement in the condition of the urine and objective symptoms, not confirmed by subjective sensations on the part of the patient, should put the physician on his guard; reduction, for example, of excessive appetite to below the standard for a healthy child; unexpected and unexplained loose movements when constipation had previously been the rule; peculiar acetone odor to the breath, suggesting a mixture of chloroform and acetic acid; acid eructations and nausea, with or without vomiting; general prostration and disinclination to exertion; tendency to drowsiness, even in the daytime, with low spirits and despondency; attacks of dizziness, frontal headache, neuralgic pains, accelerated pulse with or without decrease in volume. After a variable period of indefinite symptoms like the above, the patient will complain of a feeling of depression, is restless at night, eats nothing, has colicky pains, vomits matter sometimes having acetone odor, has sense of constriction about the thorax causing deeper breathing than usual; the mental condition varies from excitability to mild talkative delirium, alternating with drowsy or stupid intervals.

Gastro-intestinal derangements seem to stand in causal relation, and coma may follow any unusual strain on the digestion, as also great fatigue; for instance, that of a railroad journey. If a sudden onset of nervous symptoms be noticed when the patient has been put on diet, the latter should be relaxed.*

The order of symptoms in diabetic coma is often as follows: Dyspnea, great excitement and wildness, benumbing of the senses, coma.

Sudden death from diabetic coma is possible in cases like the following: Sugar in the urine not controlled by diet and medication; patient extremely weak; lower extremities edematous; tongue red, raw and glazed; mouth and throat covered with aphthous patches; uncontrollable diarrhea; acute inflammatory affections of the lungs present, or, earlier in the disease, chronic pneumonia.†

The urine in diabetic coma is diminished in twenty-four hours' quantity, and in amount of sugar. There is extreme acidity, and the urine may have the acetone odor. Albumin in small quantity is usually though not invariably found. The so-called ferric chloride reaction is sometimes noticed.‡

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* From Mitchell's "Clinical Study of Diseases of the Kidney," second edition, page 380.
† *Ibid.*, page 379.
‡ *Ibid.*, page 381.

Cystitis.—This disorder may occur in connection with diabetes. Teschemacher records a case of a boy of eleven in which, on the advent of vesical catarrh, the glycosuria disappeared, reappearing with the improvement in the vesical condition.

Effect of Mental Excitement.—The influence of mental excitement on glycosuria is shown by Teschemacher in an account of a very interesting case. A delicate boy of seven, hereditarily predisposed to diabetes, being attacked by this malady, was put on restricted diet, when the sugar, which at first was 4 per cent., fell to 0.35 per cent., and subsequently disappeared altogether. Soon after this he was attacked by a dog, which sprang at him and he fell to the ground, where he lay half unconscious with terror. He was carried home and put to bed. Trembling at first and speechless, he lay in bed for some hours before he partook of food, while he repeatedly asked for drink. Next day he was brought to Teschemacher, who examined the urine, and was astonished to find 3.3 per cent. of sugar. According to the mother, the quantity of urine passed was increased. Restricted diet was again ordered. On the following day the sugar stood at 2.4 per cent., two days later at only 1.5 per cent., and at the end of eight days it had entirely disappeared. This case furnishes a striking example of the relapse of glycosuria after great mental excitement. Dietetic errors were strongly denied by the mother, and the ingestion of milk once in measured quantity could not have led to it, as the amount of sugar passed was greatly in excess of the lactose in the milk.

In my own opinion, the effect of mental excitement and psychical influences in general on diseases of the urinary organs has not received the attention it merits. In my work on Bright's disease I have advised the strictest attention to psychical influences throughout the entire treatment. This is especially needful in the case of children who have mental terrors and annoyances from which adults are free. Few writers on diseases of children pay attention to the difficulties which lie in the way of successful treatment of many disorders in nervous, sensitive children, the real root of whose diseases is often found in mental suffering consequent upon depressing psychical conditions.

The Urine in Diabetes Mellitus.—Complete analyses of the urine of children are seldom reported. Tyson records a case in a girl four and a-half years of age who passed sixty-five to two hundred fluidounces of urine per diem, specific gravity ranging from 1027 to 1040, sugar fifteen to thirty-four grains per ounce. This child died at five years of age.

Purdy gives figures of an analysis made in one case, which will be found under the caption "Reports of Cases."

I have been sufficiently fortunate to have the twenty-four hours' urine collected several times in one case of a boy of ten. The following is a complete report of analyses made by me:

First Analysis.	Second.	Third.	Fourth.	Fifth.
Volume of urine in 24 hours { 58 fl. ozs. 1750 c. c.	42 fl. ozs. 1250 c. c.	70 fl. ozs. 2000 c. c.	85 fl. ozs. 2550 c. c.	33 fl. ozs. 1000 c. c.
Day urine	650 c. c.	1150 c. c.	1750 c. c.	.....
Night urine	600 c. c.	850 c. c.	860 c. c.	.....
Ratio of day to night	1 to 1	1⅓ to 1	2 to 1	.....
Urea, grams per litre	27	11	5	29
Urea, grains per fluidounce	12½	5	2½	13½
Urea, grams per 24 hours	34	22	12¾	29
Urea, grains per 24 hours	540	350	195	450
Phosphoric acid, grams per litre	2	0.9	0.65	2.12
Phosphoric acid, grains per ounce	1	0.5	0.30	1.
Phosphoric acid, grams per 24 hours	2.5	1.8	1.66	2.12
Phosphoric acid, grains per 24 hours	40	28	25	32
Ratio of urea to phosphoric acid	13 to 1	12 to 1	8 to 1	14 to 1
Sugar, grams per litre 40	.....	36	58	6
Sugar, grains per ounce 19	.....	17	27	3
Sugar, grams per 24 hours 70	.....	72	148	6
Sugar, grains per 24 hours 1085	.....	1116	2295	92
Sugar, per cent 4	0.1	3½	5	½
Ratio of sugar to urea	.....	3⅓ to 1	12 to 1	0.2 to 1
Specific gravity 1030	1028	1036	1037	1029
Acidity Normal.	Deficient.	Normal.	Normal.	Increased.
Sediment Uric acid.	Calcium phos. and oxalate.	.....	Urates.	Uric acid.

The urine, then, fluctuated between 33 and 85 fluidounces; the specific gravity between 1028 and 1037; the sugar between one-tenth and 5 per cent.; the urea between 195 and 540 grains per twenty-four hours; and the phosphoric acid between 25 and 40 grains per twenty-four hours. The greatest fluctuation was in the ratio of sugar to urea, which ranged from 0.2 to 1 to as high as 12 to 1. The first analysis was made three months before the fifth.

It is now more than a year since I saw the case in consultation. The patient is still alive and reported to be improving. Diabetic diet reduced the quantity of sugar, but did not improve general condition of the patient, who is now on mixed diet, avoiding, however, sugar.

In the case of a girl of twelve years of age (analysis made by my assistant, Dr. R. W. Lane), the figures were as follows:

Urine for 24 hours, 1890 c. c., 93 fluidounces.
Urea, 23 grams per litre.
Urea, 43 grams per 24 hours.
Phosphoric acid, 1 gram per litre.
Phosphoric acid, 1.89 grams per 24 hours.
Sugar, 3 per cent.
Specific gravity, 1035.

Analysis made August 30, 1893; patient said to be losing flesh gradually, and sugar still present. (February, 1894.)

Acidity.—According to Derignac, the total acidity in diabetic urine increases with the proportion of sugar, with that of phosphoric acid, and that of urea. It always increases at the moment of the appearance of attacks due to the presence of acetones. It constitutes, then, an important prognostic sign, and permits the physician to foresee these attacks, and enables him to overcome them by appropriate therapeusis.

Phosphaturia.—In two cases in diabetic children, Cerne noticed excessive phosphaturia, each case presenting foci of gangrene. Purdy mentions "excess of phosphates" in his case.*

Acetone.—This substance, and also diacetic acid, oxybutyric acid, etc., have already been mentioned.

Prognosis.—The prognosis in children's cases is bad. Seventy-five per cent. of the cases observed by Stern died. Of seventy-seven cases traced by him to a termination, fourteen recovered, seven improved, four remained unimproved, and fifty-two died. It is worth while, however, to note that the prognosis is not so hopeless as older authorities would have us believe.

Course.—The disease runs a more rapidly fatal course in children than in adults, but the duration of the disease varies greatly. In thirty-four cases reported by Stern, the shortest died in two days, the longest was still alive at the end of five years; in seven cases death took place in one month, in all but one, which recovered. Seventeen lasted less than a year, and of these, seven were cured. Ten lasted over a year, and not

* It would be clearer if writers would specify whether they mean excess of P_2O_5, or simply an abundant sediment of earthy phosphates. In the case which I saw there was neither condition.—C. M.

one recovered. As a rule, the smaller the child, the quicker the course of the disease; exceptions have been noted; thus, a child of four died after two days of diabe[illegible] and a child born with diabetes, recovered in eighteen months.

Cases are reported by Prevost, Tyson, Deane, Henricius, Roberts, Kelly, Becquerel, Drummond, Anderson, Frew, D. P. Allen, Rachford, De Bary, and McCrea, which were fatal in the following time:*

Six days,	Seven days,	Nine days,	Eleven days,
Three weeks,	Six weeks,	Six weeks,	
Three months,	Four months,	Five months,	Six months,
	Nine months,		Twelve months,
Eighteen months,	Eighteen months after observation.		

Kelly's case was a boy of ten, previously healthy, who died in eleven days from diabetes following over-exertion, profuse perspiration and cold. Drummond's case was a boy of seven, who died of diabetic coma five months after receiving a blow on the head.

Seegen classes children as examples of cases in which glycosuria continues regardless of food. In the case which I saw, however, rigorous diet diminished the sugar to a trace, for a time, at least.

Kühl finds two forms of the disease, one mild or slow, and the other severe, both terminating fatally. The latter is found among the poorer classes, which receive less and later medical attention.

Treatment.—Inasmuch as the chances for recovery are but slight, one in four at best, probably, the patient should have everything in his favor, and be very carefully handled, the urine examined frequently, and closest attention paid to every little detail. Children with diabetes are notoriously fond of sweets, and often very sly in obtaining them. If diabetic diet at once diminishes the quantity of sugar to a marked degree, great fluctuations in the quantity of sugar during supposed adherence to diet should suggest that the child cannot be trusted.

Dr. Purdy† has called attention to the fact that not infrequently the diabetic patient becomes cunning and deceitful in minor matters, especially those relating to his food, and quotes Dickinson, who says, "The mind deteriorates morally and intellectually." I think it good policy not to assume, then, that a diabetic child will refrain from eating forbidden sweets merely because he says he will.

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* Arranged according to time.
† "Diabetes," Chicago, 1890.

The first thing in the treatment should be gradual adoption of strict diabetic diet, watching its effect closely, and relaxing it if sudden onset of nervous symptoms occur. If not, the diet should be continued for several months, to be gradually relaxed when the maximum good effect has been reached, and to be begun at once again when the improvement, if any, following relaxation, ceases, other things being equal.

Dietetics, even in diabetes, is not an exact science, and must be used with observation both of the urine and of subjective symptoms. In general, however, reckless disregard of diet leads to rapid and unfavorable termination.

Diet in Diabetes.—The patient should begin the diet by cutting off saccharine foods, candy and the like; then in a week, say, potatoes; next, desserts made of flour, together with sweet fruits; finally, all cake, cakes, and bread made of ordinary flour. It is well, I think, to cut off bread last of all; moreover, if it can be proved that cutting off bread and purely animal diet do not reduce the quantity of sugar perceptibly after a week's trial, if necessary, then I allow a little bread, in quantity not to exceed two ounces daily. Finally, animal diet, meats, eggs, fish and gelatin, if more liberal diet fail to cause sugar to disappear.

Articles Allowed.—Clam-water.

Fish, without flour sauce. (No oysters, and no shell-fish generally.)

Meat soups, without flour or milk.

Meats.

Poultry, without dressing of bread or flour.

The following vegetables only: Lettuce, spinach, cauliflower, cabbage, olives, water-cresses, mushrooms, asparagus tops, cucumbers.

Eggs, poached, scrambled, soft-boiled; carefully-made omelet.

Cheese.

Bread and butter, if allowed (see above), two ounces of bread daily, that is, one small slice morning and evening.

Desserts: Blanc-mange, made of white of egg, beaten up and flavored with vanilla, sweetened with a little saccharin. Gelatin jellies sweetened with a little saccharin.

Nuts: Almonds, hazelnuts, walnuts, cocoanuts, Brazil-nuts.

Apples, which so many children eat so freely, are *not* allowed.

The question of milk-diet is still a mooted one. Jacobi says that milk, skimmed or not skimmed, forms a "principal and beneficial part of the diet" in diabetes in children.

Inasmuch as cases of diabetes in young children subsisting entirely or chiefly on milk are, as a rule, more fatal than those in older ones, it is difficult to draw deductions as to benefit

from the use of milk. I should not advise it unless careful analyses of the urine are to be made to see whether it does not increase the output of sugar. In a case like that mentioned by Haig, where urea was deficient and uremic symptoms coming on, under rigid diet, I should see no objection to its use, coupled with relaxation of the diet.

Waters and Beverages.—Waukesha or Bethesda; Saratoga Vichy. If stimulants are necessary, whisky, gin, Budai imperial wine.

Massage of the whole body is sometimes useful. It should not be too vigorous, and may be employed daily between breakfast and dinner. Schnée advises a weak solution of mercuric chloride in alcohol, with a little vaseline to be used in rubbing.

Electricity.—Electricity may be used in cases where there is great muscular weakness.

A diet which is intermediate between the rigorous one already advised and the ordinary mixed diet of every-day life, is recommended by McNutt as being, in his experience, better than the exclusive diet. McNutt's diet is as follows: The diabetic patient may eat—almond rusks, almond biscuits, gluten bread, gluten biscuit; stale bread (toasted) sparingly; bacon, butter, cheese, eggs, beef-tea, and thin soups; beef, mutton, game, and poultry; fish, oysters; cabbage, lettuce, string-beans, green peas, tomatoes, spinach, greens, olives, artichokes, asparagus; custards without sugar, jellies unsweetened; tea, coffee, cocoa without sugar; water, mineral waters, claret, milk, buttermilk, acid fruits, lemons, cherries, currants, strawberries, nuts.

I have, myself, tried such a diet in several adult cases* with apparent benefit.

INDICATIONS FOR REMEDIES.

Arsenicum takes first rank in the treatment of diabetes in children. Indications are as follows: loss of flesh, great hunger and thirst, pallor, loss of strength, tendency to gangrene, dryness of the throat and mouth, watery diarrhea, dyspnea on slight exertion. Treatment should begin with the third decimal trituration, three grains, four times daily, continued over a long period of time, the dose being gradually increased until one grain of the second decimal or its equivalent is given. Arsenicum should be given in the sixth decimal trituration in case aggravation occurs from the lower

* See "Disease of the Kidneys," page 383.

potencies, preferably also in the case of very young children and infants.

Lithium is undoubtedly of benefit in some cases. I have found it beneficial in adults and suggest a trial of it in the case of children. I have found nothing superior to it for relieving the rheumatoid pains which are sometimes very severe in connection with hyper-acid urine and uric-acid sediments. I have used it in adults in the form of benzoate, in doses of from ¼ to 2 grains of the chemically pure crude drug, four times daily. For children, the first decimal trituration might be used. Fifteen- to 30-drop doses of lithiated hydrangea, so useful in larger doses for adults, should be thought of also.

Salicylate of Sodium has been advocated in the treatment of diabetes by Jacobi, Haig, and others, given with an alkaline water, like vichy or seltzer. Jacobi says that a child of five can take 5 to 8 grains (0.32 to 0.52 grams) three times daily and continue its use many weeks. Haig claims that it sometimes increases the urea sugar ratio; in the case of a girl of eight, diabetic diet caused great fall in urea and brought on a lethargic condition; she was put by Haig on mixed diet and milk, together with 10 grains of salicylate, four times daily, and the ratio of urea to sugar rose. I am inclined to think, however, that the relaxation of the diet had much, if not all, to do with this matter.

Kreasote.—Heaviness, drowsiness, depression of spirits, head confused and dull; very severe chronic neuralgic troubles. To be given in the third decimal trituration.

Phosphoric Acid.—Of value when the case is evidently of nervous origin; when there is loss of fluids; patient is indifferent to all things; long-lasting diarrhea. For thirst, potassium phosphate, two parts, in water 75 parts; teaspoonful three times daily in a little hot tea.

Uranium Nitrate.—Languor marked and general; excessive thirst. Useful in cases originating in gastro-intestinal derangement. To be given in the third decimal.

Jumbul.—This drug is still used extensively in adult cases. It is said not to be beneficial in cases where the patient is on mixed diet. I have no record of its value in the diabetes of children, but should be inclined to try it where polyuria resisting diet was a feature. It might be given in grain doses of the seeds four times daily.

Other remedies often indicated from time to time in adult cases, and hence not to be forgotten in children, are bryonia, lactic acid, leptandra, podophyllum, aurum muriaticum, nitric acid, mercurius solubilis, graphites.*

*See Mitchell's "Diseases of the Kidneys," 2d edition.

MISCELLANEOUS NOTES ON TREATMENT.

Stern, who has seen a large number of cases in children, relies chiefly on dietetic treatment. Next to this he advocates the diet and bath at such places as Neuenahr, Carlsbad, and Vichy. Alkaline bicarbonates are the best drugs, though none are specially curative.

Schnée claims to have cured four children, ages nine to thirteen years, one of his cases still showing no sugar five years after cure. His treatment was Carlsbad water, Turkish baths, internal remedies, and massage of the whole body. In the case of a girl of nine, cure was brought about by the use of Carlsbad water for two months in conjunction with Russian baths and wet-sheet packings, massage of the whole body and internal medicines. He does not name the latter, but in another part of his work praises Bamberger's formula for corrosive sublimate-albuminate and potassium bichromate, using these remedies both internally and externally by massage.

Treatment of Diabetic Coma.—Preventive treatment, if possible, is the only one. Fatigue, especially that from travel, is to be guarded against; diet relaxed, and the bowels opened with castor oil. When patient begins to be drowsy and to have pains in the stomach, give hot bath and make hot applications to extremities. Try also sodium bicarbonate in 10-grain doses hourly.

Reports of Cases.—Inasmuch as diabetes in children has hardly received merited attention, it will not, I hope, be out of order to quote reports of the following cases found in the journals:

Dr. J. S. Thatcher exhibited a specimen of blood removed from a girl fifteen years of age, in the service of Dr. Beverly Robinson at St. Luke's Hospital. "About four or five months before her death she began to lose flesh and strength, and to suffer from great thirst. During the three months she was in the hospital the urine contained no albumin, and the daily average of sugar was from four to six per cent. She gained in weight slightly immediately after admission, but afterwards lost flesh steadily. The day before her death she was up and around the ward; about ten hours before death she was found to be cold, and suffering from labored breathing, and three hours later, after a dose of morphin, she was found asleep, with a pulse of 130, and respirations 16 and very deep. About six hours before death she was seized with a tonic spasm, which lasted for about ten minutes, and was succeeded by coma which continued until her death. All the vessels in which any blood was found contained blood of white color, or of the pinkish

hue shown in the specimen. In the heart there were some reddish coagula and a quantity of blood looking like coagulated milk. The occurrence of dyspnea is interesting in connection with this fatty condition of the blood."*

In a clipping which I have found from the *Therapeutic Gazette*, in which the name of the writer has been unfortunately torn off, occurs an account of the following case:

"This case at the Chelsea Infirmary was kindly placed under the treatment by Mr. Moore. It was of the so-called pancreatic type. A boy, aged thirteen, whose father had recently died of diabetes, had suffered from symptoms of diabetes, before beginning this treatment, for six months. From January 1, 1892, he was placed on diabetic diet, and was given first codein, from which he received no benefit, and then morphin, under which he improved. The zymin treatment, with diet as before, was begun May 18. His general condition was bad; appetite not ravenous; thirst great; weight, five stone, ten and three-quarter pounds; quantity of urine in twenty-four hours about 99 ounces; specific gravity, 1036; sugar estimated at 6.5 grains per ounce. Zymin was given in increasing doses, with the subsequent addition of sodium bicarbonate, and finally pancreatin pills, coated with keratin, were substituted. A daily record of the amount and specific gravity of the urine was kept, and quantitative estimates of sugar were made with Fehling's solution. The treatment was continued till August 21, when he left the infirmary. Unfortunately, owing to deception on the part of the patient, and dietetic indiscretions, which caused diarrhea on more than one occasion, many of the observations are valueless, and with the amount of comment necessary would be out of place in this summary. What is certain is, that his general condition vastly improved, his weight increased 7¼ ounces and thirst diminished. During the first ten days of treatment the amount of urine in twenty-four hours averaged 78 ounces, and for the last ten days before leaving it averaged 35 ounces, while the specific gravity for the same periods averaged 1036 and 1027 respectively. The first reliable quantitative estimation of sugar, made May 20, gave 6.5 grains to the ounce; the last, made at the end of June, 4.5 grains. The boy was re-admitted November 5, and is still in the infirmary. He is improving under opium, but has not reached the standard of last summer under the pancreatic treatment.

"No definite deduction can be made from this case, owing to the facts, already mentioned, that he was improving at the time zymin was commenced, and the intractability of the

* *Medical Record.*

patient, while the summer weather and the continuance of restricted diet were in his favor."

Dr. W. D. Hamaker* reports the following case:

E. H., female, white, aged fifteen years; consulted me November 7, 1887, with the following history: She had the ordinary diseases of childhood; had had scarlet fever when two years old. No history of rheumatism nor of any fright or shock. She began to menstruate in June last; menses scanty and pale. No disease could be discovered on the father's or mother's side, except that one aunt had chorea.

In July she failed in health, and about two months before coming to me, she began to have a ravenous appetite, with loss of flesh, great thirst and increased amount of urine. These increased rapidly, and on November 7 she presented great emaciation, pale skin, dry, fissured tongue and hay-like odor of breath.

November 8.—She weighed 87 pounds, and the amount of urine in twenty-four hours was 36 pints, with a specific gravity of 1028, and giving a strong reaction with Fehling's solution. She was also troubled with pruritus vulvæ. I put her on 1-24 grain of strychnin and 3 grains of ergotin t. d., and a strict diabetic diet.

November 14.—Urine diminished to 12 pints, with specific gravity of 1026. Was able to keep her on the diet very easily. Thirst was much diminished.

November 21.—Put her on three grains of carbonate of lithium and 1-10 grain of arseniate of sodium per diem, dissolved in a quart of water. This is to be drunk at meal time. No other medicine was given, and the diet was continued as before. Not much liquid allowed, except a couple of glasses of milk and the water taken with the medicine.

November 28.—Amount of urine per diem 11 to 12 pints in the last week; weight 86 pounds; feels much better; thirst not marked; no pruritus. A large alveolar abscess opened today. General appearance of patient much improved.

November 29.—Last night was the first night in which she was not compelled to rise to urinate.

December 1.—Weight 87 pounds.

December 3.—Arseniate of soda continued at 1-10 grain per diem, but the lithium carbonate increased to 12 grains per diem.

December 8.—Medicine and diet continued as before. Patient feels better and looks better; drinks very little.

December 13.—Reduced liquids to one pint of water with the

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* *Therapeutic Gazette.*

medicine. Allow no tea, coffee, apples or oranges, and as little water or milk as possible; weight 87 pounds.

December 20.—Strong and bright; specific gravity of urine, 1028. From November 28 to present date the amount daily has been from 9 to 12 pints.

December 24.—Quantitative analysis showed 22 grains of sugar to the ounce. This was the only quantitative analysis made.

January 2.—Weight 87 pounds; specific gravity 1022; general health improving. Patient has adhered strictly to diet and the treatment continued as before. A small piece of well-done toast was allowed twice a day, but immediately the urine increased in amount. The toast was stopped at once.

January 8.—The daily amount of urine continues at 10 to 12 pints; specific gravity, 1022. Apparently she was doing as well as before.

I did not see the patient again till January 16, when I found her almost comatose, with labored breathing; tongue and lips dry and parched; some pain in the chest and great deafness; specific gravity of urine, 1015; and strong reaction was shown on testing for acetone. Death ensued the following day.

In this case the new treatment was faithfully carried out in every detail for eight weeks, and until one week before her death there was apparent improvement; but the sudden change, the onset of coma, the presence of acetone and the other symptoms showed no difference from the termination of cases treated by the old methods.

My next case I shall treat in the same way; for we should give a fair trial, in so intractable a disease, to any method which promises to be successful in even a few cases.

Dr. F. C. Simpson reports the following:*

"John S.; boy three and a-half years old; parents living and healthy; neither parent showing any hereditary taint as to diabetes. I saw him on October 23, 1891; he seemed to be well-nourished and what I would call a fairly healthy boy. I gleaned from the parents the following history:

"The boy had for the past three weeks showed decided muscular weakness, increased urination and quite a thirst, drinking quite a quantity of water during the twenty-four hours. He also had a partial loss of appetite, which is contrary to the habit in the majority of these attacks. He was very fond of sweet things, and was allowed to eat freely of these, such as preserves, candy, etc. Upon inquiry, his mother thought that he must have passed about three and one-half

* *American Practitioner and News.*

pints to four pints of urine in twenty-four hours. He asked for water while I was examining him, and drank off a glass without stopping. I asked for a sample of his urine, which was sent me the next morning, the first he had passed after getting out of bed. Test of urine: Color, straw; reaction, alkaline; specific gravity, 1040. Upon adding the urine to Fehling's solution under heat, it turned a yellow color, which was at once precipitated to a copper-red, showing conclusively that sugar was present. I afterwards had a quantitative test made, and the report was about three grains of sugar to the ounce. At this time the boy's parents gave another chapter in the history, in which it was brought out that the little fellow had fallen down stairs (about fifteen or twenty steps) just before the time that they had noticed the symptoms detailed above. In the fall the boy did not become unconscious, and there was nothing more than a scare. He did not complain of any pain about the head; in fact, he seemed to be all right in a few minutes, and never showed any signs of after-effect.

"I made another examination of his urine at the end of a week, and found there was a slight decrease in all his symptoms and not as much sugar; specific gravity, 1030. His mother said he did not show as much thirst, and the quantity passed was only three pints during the twenty-four hours. I had instructed her carefully to measure each quantity passed. I saw the child at the end of two weeks, and a sample of his urine showed a specific gravity of 1024. Fehling's test showed sugar in very small quantity. I had a quantity test made, and it showed only one grain to the ounce. His general health was greatly improved; thirst was not as great, and the quantity of urine was only two pints in the twenty-four hours.

"The treatment was ergot and bicarbonates, and this was the only treatment he received during the three weeks. He has continued to improve from the beginning of treatment, and at the end of four weeks the urine is normal. His general health is greatly improved, and I have made examinations of his urine every week, and found nothing abnormal. I consider the boy cured of his diabetes."

The following questions may be pertinently asked: What was the cause of this glycosuria? Was it due to injury of the brain induced by the fall, or was it due to the causes that produce diabetes we so frequently see in the adult? The nervous element was the predisposing cause, and the shock had something to do with producing the saccharine urine.

Leva saw a case in a girl of twelve, of healthy parents, nine months ill. It began without known cause, with intense thirst, rapid emaciation, cramps in the calves, and soon intense

glycosuria, polyphagia, polydipsia, polyuria, and malaise. On the fifth day after treatment was begun coma set in, and death followed in two days. Autopsy showed atrophied heart, atelectasis of deep portions of the lungs, slight enlargement of the spleen, enlarged kidneys, and milky condition of the blood.

Shaffer reports a case of a boy of fourteen years, who had never been ill until on a certain date (December 27) he was thirsty and passed much water at night. On January 4 he went skating. On January 5 he had dyspepsia, constipation, excessive micturition, and thirst. On the 8th there was labored respiration, mostly thoracic, with decided hebetude. On the 9th, at midnight, he was moribund, but rallied under stimulants and external applications. Temperature, 96° to 98°. He became comatose at 10:30 A. M., and died.

Watkins-Pitchford reports a case in a boy eight years and nine months old, who, for a fortnight, had had dry mouth and throat; polyuria; urine, 1035 in specific gravity; no albumin, but sugar present. The pulse was 80 and strong. A few days after, being placed on diabetic diet, respirations doubled in frequency, but there were no physical signs. He vomited once or twice at intervals of a few hours, and the temperature was subnormal. He died on the following day. During the twenty-four hours prior to death he passed 16 ounces of urine, of a specific gravity of 1040, strongly acid, plenty of sugar and ⅛ albumin. His mother had died, eighteen days previous to the beginning of the boy's illness, of phthisis pulmonalis.

Dr. C. W. Purdy reports the following case:

CASE 223.—B. G., December 31, 1888. Patient's age four years and three months. His mother first noticed, in August last, that he was urinating very frequently, "wetting the bed" at night. About the same time he became very thirsty. He has recently lost considerably in weight. He complains of being weak and tired much of the time. His mother states that he urinates about every half-hour. Careful inquiry fails to reveal any history of diabetes in the family, but tuberculosis is prominent. The patient has had no serious illness before, but he fell upon the floor of a car a short time before his present illness began, and sustained a severe blow upon his head. His urine to-day is clear; color, light greenish-yellow; acid reaction; specific gravity, 1033; and contains 20 grains of sugar to the ounce. The urine is free from albumin. The patient was ordered a diet of milk, meats, a little cracker, and some green vegetables. No medicines were prescribed.

January 3, 1889.—Urine to-day: specific gravity, 1025; sugar, 12 grains to the ounce.

February 4.—Urine: specific gravity, 1030; sugar, 10 grains to the ounce, no albumin; diuresis and thirst greatly diminished; he gives his nurse no more trouble at night from calls to urinate. The family physician now volunteered to cure the patient, and, as my prognosis was such as to afford the parents no hopes of recovery, the patient passed into the hands of the more sanguine physician.

October 14, 1889.—The parents of the child returned and requested me to resume treatment of the case. Examination of the patient showed extreme emaciation, great thirst, and diuresis. The patient had been permitted a mixed diet, including all fruits and farinaceæ, and, as a consequence, the disease had progressed at a rapid pace. Examination of the urine resulted as follows: color light; reaction acid; specific gravity 1038; sugar present, 25 grains to the ounce; urea, .013 gram to the cubic centimetre of urine (13 grams per litre, 6 grains per fluidounce); phosphates greatly in excess; the urine is free from albumin; the patient seems tired, weak, restless, and has little or no appetite. He was put on milk with a little bread, and quinin was ordered in 1-grain doses three times a day.

October 18.—The appetite has somewhat improved, and the patient seems less weak. The urine to-day is clear; acid in reaction; specific gravity, 1033, and contains 25 grains of sugar to the ounce; phosphates greatly in excess; no albumin present; diet to be restricted almost entirely to milk; to continue quinin, 3 grains daily.

October 21.—Urine, 4 pints; specific gravity, 1029; sugar, 18 grains to the ounce. To continue treatment as before.

October 28.—The patient seems very weak; has little or no appetite. Urine to-day: specific gravity, 1033; sugar, 16 grains to the ounce; phosphates in excess; no albumin present.

November 4.—Urine to-day; specific gravity, 1029; clear; acid reaction; sugar present, 12 grains to the ounce; phosphates in excess. To continue milk diet, with very little bread, and some green vegetables.

November 12.—Urine: specific gravity, 1024; acid reaction; sugar, 10 grains to the ounce. The patient is weak; has little relish for food, and is troubled with slight cough.

November 24.—The cough is better, and, on the whole, the patient seems somewhat stronger. Urine, 5 pints; specific gravity, 1028; sugar, 10 grains to the ounce; no albumin.

December 6.—Urine is clear; color light; specific gravity, 1033; sugar, 10 grains to the ounce.

December 18. — Patient began to complain of pains in his stomach and bowels, and to grow a little drowsy to-day. His respirations were somewhat quickened. He was given a hot

bath, and hot bottles were applied to his extremities, and 10-grain doses of sodium bicarbonate were ordered every hour.

December 19.—Patient is more stupid to-day; sleeps much of the time. The respirations have increased in frequency to 40 per minute; the temperature is 101° Fahr. The abdominal pains have subsided. Toward evening the patient became more stupid and refused all food.

December 20.—Patient died to-day in a comatose state, without convulsions.

CHAPTER IX.

DIABETES INSIPIDUS.

Definition.—Diabetes insipidus is a disease characterized by persistent polyuria, without presence of sugar or albumin in the urine, and usually accompanied by polydipsia.

Etiology.—The disease is common in childhood. Some cases are hereditary in origin; others probably due to brain lesions, syphilitic and otherwise. Inveterate masturbation, incontinence of urine, or tapeworm were the only exciting causes ascertained in some cases. Cases are said to originate from trauma, especially to the head, or febrile attacks. Violent muscular effort and violent mental emotions are said to cause it. It occurs in tubercular meningitis, epilepsy, and hereditary syphilis, and as sequela to acute infectious diseases. It has in some instances been apparently traced to parents allowing young children to drink alcoholic liquors. Exposure to cold, and drinking cold fluids when heated, and exposure to hot sun seem to have been exciting causes in a few cases. Abuse of diuretics has been mentioned as an exciting cause. Johannesen reports a case in an infant apparently due to the bite of a wood-beetle. In many cases the etiology cannot be determined. In general the disease is thought to be a neurosis having its origin in the dilatation of the renal arteries, from paralysis or irritation of their vaso-motor nerves.

Age.—Out of 70 cases mentioned by Roberts, 7 were infants; 15 from five to ten years old; 13 from ten to twenty, and the rest from twenty to seventy, only 4 being from fifty to seventy. In other words, fifty per cent. of the cases were under twenty years of age, and not quite fifty per cent. between twenty and fifty.

Pathology.—The disorder has no fixed pathology. The kidneys are oftener diseased than in diabetes mellitus, but in some cases were apparently normal. In many instances lesions in the flow of the fourth ventricle, as in diabetes mellitus, have been found.

In some of the most acute cases, when emaciation and debility were great, and polyuria excessive, no pathological conditions could be found after death sufficient to account for the symptoms.

Symptoms.—In some cases polyuria, which may be excessive, is the only symptom.

Other symptoms than polyuria most commonly seen are the following: Dry, harsh, hot skin; dry mouth and throat; emaciation, thirst, which may be intense; loss of strength; neuralgic and rheumatic pains. In cases where the amount of solids in the urine is small (hydruria), the patient feels poorly, is easily chilled, appetite is capricious and there is a sinking, gnawing sensation in the pit of the stomach. In cases where the total quantity of normal solids voided in the urine is large (polyuria), there are severer symptoms, as above noted.

When cerebral lesions are present, disturbances of sensibility or of motion are present. Headache or convulsions may occur. Ptyalism has been noticed in several cases.

Cases are known in which excessive elimination of phosphoric acid occurs. In these cases, although sugar is absent, there is, in addition to the symptoms mentioned above, a tendency to boils, ravenous appetite, possibly cataract, as in the case of diabetes mellitus. This kind of diabetes insipidus is called phosphatic diabetes, and is associated sometimes with nervous derangements or with phthisis, sometimes with neither. Again, in some cases excessive elimination of the chlorides may be noticed (chlorine diabetes).

THE URINE IN DIABETES INSIPIDUS.

We find two forms of this disorder, namely, *hydruria* and *polyuria*. In hydruria the quantity of urine per twenty-four hours is enormous and the specific gravity below 1008. In polyuria the quantity of urine, though not enormous, is greatly increased, and the specific gravity 1010 and upwards.

The total urine per twenty-four hours is usually that of fluids ingested; but if the fluids be cut off, the urine is not diminished proportionately. The volume of urine per twenty-four hours is generally greater than that of diabetes mellitus. Very young children have been known to void as much as 30 pints in the twenty-four hours. Roberts speaks of a girl of ten who voided a little more than a third of her own weight of urine. Ten to 15 pints daily (5000 to 7500 c. c.) is not uncommon in the case of children afflicted with this disease.

The total solids are as a rule above normal per twenty-four hours though decreased relatively (grains per ounce, grams per litre.)

In some cases, without great increase in twenty-four hours' urine, the total phosphoric acid is double or treble the normal

per twenty-four hours (phosphatic diabetes), and the urea phosphoric-acid ratio diminished.

Peptone and hippuric acid are occasionally found.

The urine is usually feebly acid, undergoes alkaline change readily, and then deposits a white, creamy sediment of simple phosphates. The color is from pale-yellow to light-yellow and the odor deficient. When freshly voided, it is clear like water, but soon becomes cloudy from presence of micro-organisms. The sediment is very scanty in the freshly-voided urine, and usually contains nothing of significance.

I am convinced that the ordinary computation of total solids by Trapp's co-efficient is worthless in some of these cases, especially in hydruria.

Analysis of Children's Urine.—Grancher reports a case in a child (sex not mentioned) of eight, in which the etiology was a blow on the left temple. The twenty-four hours' urine was 14 to 16 pints (7 to 8 litres); the specific gravity, 1003 to 1004; urea 1.2 grams per litre (0.5 grains per fluidounce); urea, total, less than 10 grams (155 grains) in twenty-four hours. Chlorides were 0.7 gram (11 grains), phosphates 0.10 gram (1 1-2 grains) in twenty-four hours.

This, then, is an example of the first class of cases mentioned above, namely, simple hydruria. Now the total solids in this case computed by Trapp's co-efficient would be 4x2x7, or 56 grams, manifestly an absurdity, as the total urea, chlorides, and phosphates all together, were less than 11 grams, and it is not likely that the remaining constituents, sulphates, creatinin, etc., would amount to 45 grams.

Course and Prognosis.—The duration of the malady is uncertain. Congenital cases may last fifty to sixty years. Cases which recover usually do so in one or two years, though recovery in a longer time is not impossible. Cases beginning suddenly and those due to blows, run a most acute course, and may die within a few months, though Guinon, differing from other authorities, regards cases due to trauma, as well as those dependent on febrile attacks, as especially curable. Those beginning in youth without known cause are regarded favorably from the standpoint of prognosis.

In some cases the patient lives for years in comparatively good health, succumbing possibly to phthisis, pleuro-pneumonia, or organic disease of the brain, since diabetes insipidus is seldom fatal by its own virulence.

Owing to the contradictory testimony of the different authorities, and the absence of pathological information, we must form our opinion from the general condition of the urine. If the urea and phosphoric acid are not largely in excess of normal,

the patient being well cared for and without hereditary taint, it is possible that he may live as long as otherwise. If, on the other hand, there is marked increase of urea and phosphoric acid, suspect the condition to be but a prelude to serious constitutional disturbance, and give ultimately unfavorable prognosis. In some cases nervous disorder or phthisis appears; in others, diabetes mellitus. Albuminuria is an unfavorable sign, as is also edema of the feet. In one case which I saw, apparently congenital, at the age of sixteen I found albumin; two years later casts appeared, the patient became more or less edematous, and died of uremia. Children may succumb to exhaustion caused by loss of rest, tormenting thirst, and mental worry.

Treatment.—Everything which aggravates the condition must be sought for, and if possible removed; inveterate masturbation, enuresis, even tapeworm, hereditary syphilis, must not be overlooked. Phimosis and rectal diseases should receive attention.

When the patient is not voiding too much urea, give food and drink liberally, seeing to it that drinks are not too cold. The various drinks may be thickened, as, for example, by the use of a handful of raw oatmeal to a quart of boiling water with a lemon sliced into it. Warm woolens should be worn, and the patient, if possible, spend winters in a warm, dry climate. Salt-water douches are sometimes useful in promoting bodily vigor. Warm baths, followed by friction of the skin with coarse towels, are beneficial.

In cases where urea is increased relatively to the weight of the patient, nitrogenous food is to be limited. Alcoholic drinks and coffee not allowed. Vapor baths, followed by salt-water tepid douches, are recommended and a dry, bracing climate sought. Hygienic care and regulations, as in diabetes mellitus, ordinary warm baths, followed by friction of the skin with coarse towels, are often found beneficial.

Remedies.—Those already mentioned under diabetes mellitus are frequently indicated in this disorder.

In anemia and debility, *ferrum*, *nux vomica*, and *china; cod-liver oil* and the *iodide of iron* will help debilitated children with diabetes insipidus. In syphilitic cases, *iodide of sodium.*

Jumbul will undoubtedly, in some cases, decrease the quantity of urine; but its action is at best but imperfectly understood, and it is said not to be efficacious with the patient on a mixed diet.

Helenin will be indicated in some cases.

Apocynum is said to be useful for the well-known "sinking sensation" at the stomach.

Strychnia, in one-grain doses of the third decimal trituration,

possibly increased in time to the second decimal, is of use in combating the various nervous symptoms.

Sodium bromide is believed by Purdy to have arrested two cases; he thinks that the drug should be given in doses large enough to affect locomotion, and then decreased to a point just short of affecting it. In some cases the constant galvanic current has been found beneficial. Purdy says that the best results are said to follow the application of the positive pole to the cervical region over the vertebra, and the negative pole to the lumbar region and pit of the stomach, alternately.

Ergot appears to have cured some cases. The doses recommended are 60 to 120 minims of the fluid extract for an adult.

Miscellaneous.—Claims are made by the older school of curês by the following agents: *Potassium iodide* and *mercury* (dose not given) reduced the urine of a child of six from 30 pints to 4 (Demme); combined use of *antipyrin*, 0.5 gram (7¾ grains) three times daily, powdered *valerian root* three times daily, and galvanism to the cervical sympathetic and to the spine, cured a case in a boy of twelve years, who voided 13700 c. c. in twenty-four hours, with specific gravity less than 1001 (Zeuner).

CHAPTER X.

ENURESIS.

Definition and Synonyms.—Involuntary emission of urine; incontinence of urine. Enuresis nocturna, incontinence of urine at night; enuresis diurna, incontinence of urine during the day; enuresis continua, incontinence of urine both during day and at night.

Etiology and Pathology.—In a large number of cases the cause is persistence of infantile weakness in the neck of the bladder—incompetence of the sphincter. In another series of cases, increased reflex irritability of the bladder is the cause, complicated or uncomplicated with the above described incompetency of the sphincter, and depending either on the bladder itself or due to some outside cause (Jacobi). Some of these causes of irritability are as follows: fissure of the neck of the bladder, vesical calculus; increased irritability of the bladder from unknown cause; increased quantity of urine, as in diabetes, nephritis, or from increased ingestion of water; irritant nature of the urine from hyperacidity, hyperalkalinity, or drugs, including salines, chlorides, and chlorates; anal irritation from pin-worms, fissure, eczema, etc.; hyperesthetic state of the external genitals dependent on stricture, phimosis, balanitis, etc.; the psychical influence of dream impression. Unconscious micturition may also be due to general debility, spinal disease, injuries and diseases of the spinal cord, diseases of the vesical nervous supply, and acute febrile diseases. In some cases the complication of enuresis with general muscular insufficiency is very marked. Masturbation is said in the young to lead to chronic inflammation of the whole prostatic portion and the neck of the bladder, which is then very sensitive; hence incontinence of urine may sometimes be due to this habit. Cystitis adds to the irritability of the detrusor muscles and is a frequent cause of incontinence, when this makes its appearance in children whose micturition was normal before (Jacobi).

Pyelitis and vaginal catarrh are also to be included in the etiology.

Taylor's classification of the causes of enuresis is as follows: mechanical, diathetic, reflex.

Mechanical causes are adherent folds of mucous membrane

in and about the genitals; mechanical irritation of foreign bodies, as seat-worms. Small polypoid excrescences at the neck of the bladder in very young girls have been found by Jacobi.

Diathetic causes: Uricemia is often found after over-fatigue in play or excitement, or manifested by tonsilitis or several forms of pharyngeal irritation, or by sediment of uric acid in the urine. Phosphatic urine or urine alkaline from fixed alkalies is to be reckoned among these causes.

Reflex causes may be a combination of mechanical and diathetic, or a result of emotion, habits, instability of nervous balance.

Slight palsies should be searched for. Taylor believes that enuresis is often found in children in whom slight hemiplegias with descending degenerations had occurred.

Insufficient innervation, as in the case of slow, dull, stupid children, is a cause.

Mouth-breathing children may have incontinence due to slow carbonic-acid poisoning.

Krauss divides the causes of enuresis into four groups: First, functional disturbances of the genito-urinary organs causing irritation, as tight prepuce, irritable clitoris, narrow meatus, sensitive urethra, weak sphincter, cystitis, due to pressure on bladder in pregnancy, and ascarides in the rectum; second, cerebral nervous disorders, precocious and pernicious mental development, and dreams; third, failure of spinal reflex, as in locomotor-ataxia, transverse myelitis, tumors of the cord; fourth, organic changes in the genito-urinary tract.

Van Tienhoven believes the exciting cause of nocturnal enuresis in boys to be the incomplete closure of the prostatic urethra, during the general muscular relaxation of sleep. The urine collecting in the bladder soon finds its way into the urethral pouch and gives rise by its presence to reflex detrusor spasm.

Kupke thinks it possible that incontinence is often the result of a weakness on the part of the spinal cord, which loses its power to transmit to the brain the impression of distention in the bladder. On the other hand, we must admit that an anesthetic condition of the sensitive nerves of the bladder can occur, by reason of which the micturition center in the spinal cord is only feebly made aware of the need to urinate. Weakness of the bladder, from general debility or anemia, is a very common cause; the bladder, not being able to tolerate any quantity of urine, readily excites the motor apparatus. A case of the kind has been known to follow typhoid fever.

Hysterical children may have nocturnal incontinence. Ac-

cording to Trousseau, the first cause of incontinence is a neuropathic disposition. If periodicity of incontinence is a marked element in it, then the condition is nervous in origin.

Incontinence may accompany severe nocturnal epilepsy and in all obscure cases possibility of the latter should not be overlooked. It also may accompany night terrors.

Bobulescu saw two cases, four and five years old respectively, in which the incontinence was dependent upon splenic hypertrophy.

It is now held that certain cases of incontinence in boys disappear with growth and development of the prostate, which is properly a muscle and not a gland.

Diurnal.—Incontinence of children is thought by some authors to depend on inordinate and uncontrollable contraction of the bladder, hence, sometimes denominated chorea of the bladder. Oberländer thinks it due only to reflex irritation in the urethral and anal openings. Fauboren says the cause is insufficiency of the sphincter vesica, which permits a little urine to enter the upper portion of the urethra, and its presence there causes a further performance of the act by the excitation of reflex contraction. Enuresis is attributed by some to a lack of power of retention, and enfeeblement of the voluntary power of the sphincter at the neck of the bladder and commencement of the urethra.

Bissell thinks daytime enuresis due most commonly to some constitutional or general cause. It is found in children who are bright, cheerful, active, hypersensitive, or dull, stupid, and slow in mind and muscles. It may also be due to some local disturbance or irritation, or phimosis, worms in the vulva, vagina or rectum, inflammation of bladder and urethra, stone, growths, etc.

EXAMINATION OF PATIENT.

1. Examine the rectum; look for pin-worms, fissure, eczema. Inquire whether constipation is present or not.

2. Examine the external genitals; look for phimosis, adherent folds of mucous membrane in and about the genitals, sensitive clitoris, tight prepuce, narrow meatus; hypersensitive condition of the vagina, vestibule and urethra in girls, points to masturbation as a cause;* enlarged penis and scrotum in boys, together with general malaise, dull headaches, alteration of temper and somnolence, are due to same cause. It is needless to say, however, that catching the child in the act is the surest

*See also article on "Diagnosis of Masturbation."

means for diagnosis of this habit. Look for balanitis, vulvitis, stricture of the urethra, urethritis, sensitive urethra, excrescences about the meatus urinarius in girls. Vaginal catarrh must not be forgotten. Possibility of retention in the bladder should not be overlooked.

3. In case nothing be found by examination as above, collect the twenty-four hours' urine, examine it, and also a freshly-voided specimen; the night urine may be saved either by the devices already mentioned in case of young children, or by use of a rubber urinal in older ones.

The points to be sought for in the examination of urine are presence of cystitis, pyelitis, nephritis, or diabetes; or, if these are absent, effort should be made to ascertain whether or not there is increased acidity, whether uric-acid crystals, calcic oxalate, triple phosphate, or even simple phosphates (earthy) are present.

4. If the condition of the urine shows nothing, look for malformations of the urethra and bladder, and for stone in the bladder.

5. Still further, if nothing thus far has been found as a cause, consider muscular weakness of the bladder due to general debility, anemia; inquire for history of recent severe illness, as typhoid. Investigate the possibility of spinal disease, and look carefully for slight palsies. Nocturnal epilepsy must not be forgotten, and mouth-breathing looked after.

6. Even if no signs of uricemia be present in the urine, examine patient for presence of tonsilitis or pharyngeal irritation, and if found, examine urine frequently for evidences of uricemia, especially that voided after over-fatigue at play.

7. Next inquire for psychical causes; ask the child if he dreams that he wants to urinate, or that he is urinating. Observe whether the child is intensely somnolent, unbalanced, etc., etc. Ascertain whether *periodicity* of incontinence is a marked feature; if so, the case is of nervous origin.

Treatment.—Enuresis dependent upon the conditions enumerated one to five, will yield only to successful treatment of the disorders to which it is secondary. Rectal diseases require attention from an orificialist. In cases due to phimosis, circumcision, as an extreme measure and only when absolutely necessary, should be performed when the prepuce is adherent; it is generally sufficient to break up the adhesions by stretching the prepuce and removing the smegma.

Taylor describes his method of stripping adhesions as follows:

"I take a blunt-pointed probe, or similar instrument, and cautiously run it around over the head of the glans from the frenum on one side, by small circular motions, to the frenum on

the other, and then advancing the point of the probe again rotate back to the first point to the right, and then over to the left, until gradually I have broken up the adhesions under the foreskin, and then, when this is done, I introduce into the cavity thus formed some lubricant, and make sure of its proper distribution. Afterwards the foreskin may be gently retracted; but if the opening be small, I postpone this for a day or two, when, again running the probe back and forth over the glans, very likely the foreskin can be retracted. Failing, I wait a few days longer, and if the os still be very constricted, I gently stretch it by some suitable instrument, as a pair of dressing forceps, and thus gradually secure my purpose. The mother is carefully instructed to wait a certain length of time after my manipulations, and then herself to retract, wash, and reanoint the parts; to be done at intervals of two or three days. A more rapid stripping may be safely done, but in the manner described everything needed is usually accomplished, and with the minimum of pain and discomfort to the child and of alarm to the mother, always an important consideration.

"In little girls, irritations about the vagina must be looked for in the same way, although occurring less frequently. The prepuce of the clitoris is not seldom adherent, just as occurs in boys. The process of relieving it is very much easier in the girls, however, and yet of quite equal importance. It may sometimes be necessary in these procedures to use a little cocaine locally, but it is well to bear in mind that this is a very dangerous measure."

If there is balanitis, the remedies are *merc. cor.*, *merc. sol.*, *thuja*, and local applications, as *calendula;* in valvitis, *arsenicum*, *thuja*, *mercurius.*

Cases due to masturbation or nervous diseases belong under consideration of the treatment of the latter disorders.

For incontinence referable to uricemia (lithemia), see treatment under heading Uricemia. Diet and the benzoates are useful when uricemia is a cause.

When the cases are dependent upon irritability of the bladder, *belladonna*, in 10 to 20 drop doses of the tincture, or *atropinesulphate*, one grain in an ounce of water, given in doses of one drop for each year of the child, at four and at seven evenings, so as to have the pupils dilated during hours of sleep. The dose at bedtime need not be given if the child's pupils are well dilated, and in the case of small, feeble children, great care must be taken in giving atropin. Moreover, atropin is not a specific.

In cases apparently due to lack of tone in the sphincter, *rhus aromatica* is certainly of service; dose from 4 to 10 drops of

the fluid extract four times daily, gradually increased to from 8 to 20 or 30 drops, according to age of child. If given in too large doses at first, it may disturb the digestion. Children two to six years old may take 10 drops night and morning, other children 15 drops. Its favorable effects may not persist. In one of my cases the child did not wet the bed in those nights in which he took 30 drops before going to bed; in nights when he did not take the remedy he infallibly wet the bed.

Ferrum muriaticum has been recommended; 2 drops of *liquor ferri muriatici* in a wine-glass full of water, tablespoonful every three hours during the day.* *Gelsemium, equisetum, eupatorium, pulsatilla* are credited with cures.

In cases of atony of the sphincter, electricity is advised. Ultzmann held that the best treatment is indirect stimulation of the sphincter through the rectum. He used the ordinary Dubois-Reymond sledge-battery, armed with one element. One pole of the induced current is a metallic pin the size of a lead pencil, and seven centimetres long, with a wooden handle; the pencil, being well oiled, is passed into the rectum. The other pole is an ordinary sponge-holder, which, in boys, is placed on the raphe of the perineum, but in girls in the crease of the buttock. The current at first must be very weak and gradually increased. Sittings to be held daily, or every other day, and to last five to ten minutes. Treatment lasts four or five weeks.

In spinal cases *nux vomica* or *strychnin*, third to sixth decimal according to age. In hysterical children, the *valerianates*, *bromides*, etc.

Tincture of *equisetum* may be given as follows: one drachm to four fluidounces of water, two teaspoonfuls every three hours. If there is constipation, give enema of soap and water before going to bed, and after the bowels have moved place suppository of one grain of belladonna in the rectum. If for any cause diurnal incontinence take place, it should be inserted night and morning both. Abstinence from meat and liquids at night should be enjoined, and five-grain doses of benzoic acid given three times daily when the urine is hyper-acid.

Cold sponging night and morning is often beneficial as an adjuvant.

Miscellaneous Notes on Treatment.—In the *Hahnemannian* for July, 1893, Dr. Goodno describes two cases as follows:

"Some months since Dr. Myers called my attention to the value of equisetum as a remedy for nocturnal enuresis, stating that he had treated several cases successfully. Having had two cases on hand for about four and six years respectively,

*See Mitchell's "Diseases of the Kidneys," page 366.

and treatment not having been attended by any substantial benefit, I decided to make use of it.

"Case I. was a boy, aged thirteen years, who came under my care when he was seven years old, and whom I have treated intermittingly ever since. He has regularly, each night, saturated his bed, with rare exception, since he was a baby. Had given many remedies, performed circumcision, and applied a variety of 'methods' with almost no result. There was no incontinence during the day. Equis. *o* gtt. x three times daily arrested his disease at once. During the first three weeks of trial a mishap occurred only twice. During the next three weeks it occurred five times, but four were after his medicine had given out. The past month he has had 15 to 20 drops of *o* three times daily, and has had only two errors. While this boy is not cured, it must be confessed he is making great strides toward a favorable result.

"The second case is that of a little girl seven years of age, who has, like the boy, had incontinence since babyhood, but, unlike him, her trouble has been diurnal as well as nocturnal. Most days she wet herself two or three times daily. She is a very nervous child; indeed, has positive hysteria, indicated by the *globus hystericus*, and a wide range of hysterical symptoms. At times there has been a little improvement from remedies, but never any marked change until I gave her *valerianate of ammonia*, in grain doses, four times daily. This remedy not only helped her hysterical condition, but she would go a week without any mishap during the day, and miss, perhaps, every other night. After a time it failed to accomplish anything, and I gave it up after varying the dose considerably. Equisetum *o* gtt. v., three times daily, arrested the whole trouble immediately; not a single mishap occurred, day or night, for a week. Since that time the child has occasionally wet herself, both at night and during the day, but the errors have been rare."

Dr. Van Baum writes me that he has not had flattering success from use of equisetum. Personally I have had no experience with it worth mentioning.

Liebault has cured nocturnal incontinence in hysterical, or at least neurotic, children, by hypnotic suggestion.

F. C. Simpson has seen a number a cases which, treated with every possible care and with every drug known, still continue to wet the clothing, though not the bed at night. In his opinion, these cases are referable to masturbation, and he has cured a number by blistering the penis.

Overpeck, in the *Pulte Quarterly*, reports four cases as follows:

"1. The young man is well nourished, has a fair skin, blue

eyes, and brown hair. Is restless in his sleep, but hard to waken. Feet are always damp from perspiration. Is very fond of sweet things. Has no trouble with urine except at night. Gave *sulphur*.

"2. The sister is similarly organized, and the description above will apply to her with these few exceptions: Hands are always cold. She sleeps quietly, and has this symptom which is so characteristic of the remedy she received: frequent and very urgent calls to urinate during the day, and these more frequent when at rest than when exercising. Who would not say *rhus tox.?*

"They began by taking the medicine in the sixth dilution six times per day, the interval afterward being gradually lengthened, and the attenuation raised to the two hundredth. After taking these for five or six months, a letter informs me that the son is entirely well, and has been away from home on a vacation trip, which is the first in his lifetime. The sister is pronounced about cured.

"3. A boy of five years, rather thin, abdomen large. Cervical glands are slightly enlarged at times. Urinates frequently, and that passed involuntarily at night is very offensive and profuse. He is particularly fond of sweets, and at times has indications of the presence of stomach worms. He has been doctored by a 'regular,' and finally circumcised, all to no purpose. In this case I gave *calc. carb.*, with occasionally a few powders of *santonin*, then followed these with sulphur. This may not have been scientific prescribing, but it did the work in a few weeks.

"4. Boy of three years, subject to epileptic attacks. Has a large head. Was slow in teething and walking, and had eczema on face and scalp. Calc. carb. has cured the urinary weakness, and the general condition of the patient is much improved."

Dr. Sereno used electricity in the case of an unmarried woman who had had enuresis from childhood. The interrupted current was employed with a large wire. One pole in the form of a plate was applied over the abdomen, and the other brought into contract with the sphincter of the bladder by means of a vesical sound. The current was of supportable intensity and was applied for five minutes three times a week. After eight sittings the patient wetted her bed only one night out of every two and retained her urine very well during the day. A complete cure is expected.

Aldrich, of Minneapolis, cites a case of a girl of six in which albumin was found, which disappeared when rectal and bimanual massage had restored the pelvic organs to their normal tone. He thinks well of massage of the bladder per rectum, together

with a daily salt-water bath, accompanied by brief rubbing in the region of the spine, with attention to hygiene, diet, and psychical surroundings.

In the treatment of enuresis, Taylor suggests as an adjuvant that the bed be tilted, so that the child may lie with heels high and head low. An admirable rule is that the bowel be thoroughly cleansed by an enema a short time before going to bed. The following remedies have been useful in certain cases:

Hyoscin hydrobromate, in doses systematically increased until certain disagreeable symptoms, as over-dryness of the throat and nose, and dimming of vision, are observed. In many cases, desirable results are obtained before these symptoms appear. *Cantharides* in small doses slowly and cautiously increased, may be given at the same time. *Phosphate of sodium*, if there are digestive disturbances. Circumcision is an extreme measure, although at times a proper one. Taylor thinks it quite sufficient to strip the parts thoroughly, making sure that readhesions do not occur.

Milk diet is advised during treatment.

H. A. Husband in the *Canada Lancet* reports the following: "The case was that of a boy, aged 19 years, the eldest of four sons, all of whom had been troubled with the same complaint since birth. The patient had at various times been treated with tincture of belladonna, but with no apparent benefit. It was found that the boy suffered from chronic constipation, which was relieved by a pill of extract of rhubarb and nux vomica, given night and morning.

"The lower bowel was washed out every night with an enema of warm soap and water, and then a suppository containing one grain of belladonna placed in the rectum. The object of the enema was to clear out any hardened feces or thread-worms, which, by their presence, might by their irritation produce the incontinence. This treatment was rigidly continued for three months with some slight benefit, a week or two passing without a return of the complaint. The amount of belladonna was now increased to a grain and a half. And then a new symptom made its appearance. The nocturnal incontinence ceased, but the patient during the day became troubled with a constant desire to pass water, the annoyance being so great that he had to micturate every five minutes. The suppository was then ordered to be used night and morning, with the entire discontinuance of the nocturnal and diurnal trouble. During the last three months the pupils became permanently dilated, but there was no irritation of the skin, and only occasionally slight dryness of the throat. In six months a complaint which had lasted nineteen years was completely cured, and the

patient was enabled to proceed to the continent on his business, taking with him a mixture containing nitro-muriatic acid, strychnin, and gentian. The conclusions drawn from the above case are these, that of all preparations of belladonna the extract is the best ; that the success in treatment, to a great extent, depends on the clearing of the rectum of its contents, and the application of the belladonna as near the bladder as possible ; and that partial success at first is no reason to discontinue the treatment in despair."

Dr. Day * in the *British Medical Journal* speaks as follows in regard to enuresis :

" Enuresis is sometimes seen in connection with chronic albuminuria, and is occasionally so persistent as to require special treatment. It seems impossible to lay down a plan of treatment for general adoption ; the peculiarities of constitution and habits of life must be taken into consideration, and hap-hazard treatment guarded against. Some cases are cured or relieved by the combined influence of electricity, iron, and belladonna. The successful issue is in a great measure attributable to the constant care which the mother takes in feeding the child and rigorously attending to the physician's instructions. Those cases that date from birth or have lasted upwards of a year are invariably intractable and often incurable, especially if the child be of nervous parentage, or was delicate when born, or passes large quantities of urine. With respect to the utility of faradism there can be no question ; it requires to be used regularly, and to be continued for a considerable time, but it sometimes fails altogether. When the nervous system is weak, and there is general debility, the sphincter loses its power, and urine escapes by night and day without the child's knowledge. It is in such cases as these that iron and nux vomica are of service.

" If there be excess of muscular action, and the child have frequent inclination without power to control, belladonna is an admirable remedy. It occupies a prominent place as a therapeutic agent, and sometimes when combined with iron, even in small doses, it seems to do good ; but it should not be given up in obstinate cases, till either soreness of the throat is produced or dilatation of the pupils takes place. In Dr. Day's hands it has often failed when administered in any form or dose. It certainly tends to lessen irritability of the bladder, and should always have a fair trial.

" Cold sponging in the morning is very serviceable in cases of enuresis that appear to have their origin in general debility. It

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* *Therapeutic Gazette.*

braces up the nervous system and is a powerful tonic. The slight sensation of chilliness soon passes away without leaving any depression if vigorous friction with a towel be employed for a few minutes. In a case under Dr. Day's care about three years ago, the cure was attributed to this simple measure when one remedy after another had failed. The vital functions are brought into a healthier state, the skin acts better, and the appetite and digestion improve. However delicate a child may be, free sponging in tepid water, folllowed by a good rubbing, is of great value."

Kupke expresses the opinion in the *Allgem. Med. Central Zeitung*, that Guyon's method of electrization is most rational. This consists in introducing into the urethra, as far as the membranous portion, a metallic sound to which an electrode is attached, the other electrode being placed over the pubes or the perineum. The electric current should be quite weak at first.

Dr. Sänger has found good effects from the mechanical method of introducing a metallic catheter into the bladder of female children, making firm pressure backward and to the sides several times while the thumb covers the aperture of the instrument. Ten to twelve sittings are said to be usually sufficient. Such a mode of treatment, it seems to us, should not be entered upon until other milder and safer ones have been tried. In all cases we should try the effect of giving but little fluid toward evening, taking up the child several times in the first part of the night, seeing to it that the bed is a firm and rather hard one, and encouraging the child as much as possible to avoid sleeping on the back. If these fail, it might be advisable in picked cases to carry out the suggestions of a recent correspondent in *The Lancet*. His remedy is the birch-rod applied before the child is put to bed, not as a punishment, but in a true scientific spirit. Six is the regulation number of strokes, and they are to be put on where they will do the most good. After the third *séance* the cure is complete. The *rationale* of the method is that it awakens in the boy (girls should be spared the indignity) a desire to avoid wetting the bed; it draws the blood to the surface for a few hours, and thus relieves the pelvic organs; it stimulates the lumbar center, controlling micturition through the nerves distributed to the upper gluteal region; and it prevents the patient lying on his back.

Moral: Spare the rod and spoil the bed, says the *Medical Record*.

Krauss treats enuresis as follows: In cases due to irritation, as tight prepuce, narrow meatus, etc., etc., the cause is removed and *rhus aromatica* given in five-drop doses, increased to twen-

ty-five drops, four times daily. In cases due to central nervous disorders, in precocious children, for example, with pernicious mental development, etc., he gives rhus aromatica, together with the remedy for the nervous element—nervous tonics or sedatives, as *nux vomica* or the *bromides*. If, in addition, there is anemia, he advises the *iodide of iron*.

In enuresis of children, Dr. R. B. James has found *atropin* often effective, so long as its administration was continued in full doses. But after leaving off the drug the patients were no better than before. His plan was as follows (*Archives of Pediatrics*, September, 1890): A solution of atropin sulphate was made, of which one teaspoonful represented one-hundredth of a grain of the drug. Of this solution, for the first night, each child had one teaspoonful at 6 and another at 9 P. M., and this to be increased by one teaspoonful every night till a controlling dose was reached for each case. None of them were benefited by less than four-hundredths of a grain at night—that is, two-hundredths of a grain at 6 and two-hundredths of a grain at 9 P. M.—while others required as much as eight-hundredths of a grain (divided as above); one case was given as much as one-tenth of a grain at night without showing symptoms of poisoning. Nothing short of the quantity that produced full physiological effects was of any avail. After the controlling dose was ascertained for each case, it was repeated every night for about one month, when the drug was withheld altogether. It was found that many of the cases were relieved, while others were not benefited. Of the cases completely relieved, the enuresis returned in all, with one exception, in periods ranging from one to six weeks. The case that was cured was a healthy boy but slightly affected. These cases were kept under close observation for eight months, during which time many of them would go without the drug, or on reduced doses, from one to four weeks without wetting themselves. But sooner or later the relapse would occur and at the end of the eight months, they were but little better than when treatment was started.

A writer in the *Medical Record* sums up the treatment of enuresis by the older school as follows:

"Attention should be paid to the skin by use of massage, sea-bathing, alcohol sponge-baths, frictions with coarse towel, etc. Girls from six to twelve years of age or over are most intractable to treatment, and often there is no use expecting to get much relief until lessons and books are absolutely prohibited, and outdoor exercises and air take their place. Among drugs the principal indication is, first, general tonics, as for instance, *syr. ferri iodidi*, *syr. hypophos.*, with *nux vomica;* cod-liver oil, tonic doses of *quinin*, and *arsenic* for the bodily condition.

The best drug for the local effect on the bladder-muscles is *belladonna*, but it must be given until dilatation of the pupil to a considerable extent is obtained ; the effect of this drug must be carefully watched and the patient given a good deal of attention. *Strychnin* is a drug of value in these cases, for its general effect as well as for its power over the sphincter vesica. A suppository containing one-quarter grain nux vomica introduced three or four times daily into the rectum has had a very good result. *Ergot*, internally, combined with belladonna or strychnin, answers the indications. *Rhus tox*, in repeated doses of a quarter of a grain of the powdered leaves, is said to be very efficacious. The electrical current has been recommended very highly by German authors for this trouble. It is, of course, a powerful local stimulant. One electrode is applied to the perineum, the other to the hypogastrium or lumbar region. I hesitate about using instruments in the bladder and urethra unless there is positive evidence of bladder or urethral disease or of foreign body.

"Yet the skillful and careful introduction in a boy of a steel sound large enough to dilate the deep urethra and distend the neck of the bladder will often assist greatly in the cure of incontinence. Ordinarily, and in the ordinary way, the introduction of a sound or the use of deep injections is brutal, and likely to do a great deal of harm, if it fortunately does not set up a cystitis or urethritis which may be very difficult to cure. The introduction of a sound when necessary may have to be done under ether or chloroform.

"The third class of cases, where the children have all the muscles active and healthy except those of the bladder, are most puzzling. Any probable tendency to, or a constitutional disease, is either to be excluded or treated. Very often these patients are troubled with no other ailments but this one. It may have begun as a nocturnal enuresis and continued as daytime incontinence. The sphincters of the rectum are often irritable and untrustworthy, complicating the bladder trouble.

"The remedies mentioned above are also available in this class. It may be that, following a long-continued enuresis from local or other long-since removed cause, the bladder has become contracted or contractured. If so, treatment of such case will be long and tedious, and cure will depend on appreciation of the physicial condition, the internal remedies above-mentioned, and the patience of the surgeon and the patient. I have never seen good results obtained in these or similar contracted bladders by forcible or gradual distention by means of hypostatic pressure.

"The muscles of the bladder, acting very like muscles

elsewhere in the body, become strengthened and developed by exercise. Forcible distention is a dangerous and decidedly unsafe method.

"In those patients where all other methods have produced little result, and where the bladder is not contracted, continued washing of the bladder twice daily with a simple salt solution will sometimes restore to a certain degree, if not completely, the tonicity of the vesical muscles, and bring about a cure. This measure is not always practical, and is attended with considerable risk, which may be reduced to a minimum, however, by a skillful surgeon, with clean catheters and hands and a tractable patient.

"Occasionally these cases get well spontaneously, especially as they reach the period of puberty, at which time the genito-urinary system undergoes rapid changes in its development."

PART IX.

DISEASES OF THE RESPIRATORY ORGANS.

CHAPTER I.

GENERAL CONSIDERATIONS.

THERE are certain peculiarities of the respiratory apparatus in infancy that must be understood in order to properly estimate the signs of disease in this most important part of the economy. The physiological differences in the respiratory function between the child and the adult are numerous, and, in some respects, they are very marked.

For example, the rapidity of respiration is much greater in infancy, and somewhat more so all through childhood, than it is during adolescence or maturity.

At birth the respirations average from thirty-five to forty per minute — a rapidity which in the adult would cause grave apprehensions. There is not the same regular rhythmical action in early life, even in health, that is maintained later on. The respiratory muscles, like those of other parts of the infant body, work spasmodically, and under every slight disturbance of the sensory nerve, the respirations become jerky and irregular. While the infant cannot yet see, hear, smell, nor taste to any great extent, it can feel, and that most acutely.

It is through the action of the sensory nerves that the first breath is drawn, and for a long time thereafter the respirations are easily disturbed by reflex irritation.

Pauses in respiration are a peculiar, but natural feature in childhood, and they are especially marked when the child is crying. Goodheart points out what we regard as the true explanation of this peculiarity. He says it is not due to muscular weakness, as some aver, "but to the as yet imperfect education which is seen in all the muscles, whether of speech or of voluntary movement. Hence, also, the Cheyne-Stokes type of respiration, which is a paroxysmal one. Children work paroxysmally, whatever the movement in hand. The nervous discharge takes place, and then comes a pause—another discharge

and another pause—and so on ; and it is only as the nerve centers reach a higher state of training that the discharges are so regulated as to become more continuous." The "Cheyne-Stokes" type of breathing, to which reference is made above, consists of a series of short, but gradually lengthening inspirations, culminating in a deep-drawn breath, from which in a descending scale, the respiratory movements flutter down to an elongated pause. This type of respiration, though much modified and its sharper characteristics destroyed, is very often seen in infants. This should always be borne in mind in making physical examinations in children, for this disturbance of rhythm may mean little or much, as other symptoms are present or absent, to render it normal or abnormal. The breathing is diaphragmatic in children, and it is sometimes difficult to detect the movement of the upper part of the thorax if the child is breathing naturally. In examining a child, therefore, it is necessary to have the chest thoroughly bare, so that every movement of the respiratory muscles may be closely observed. Forcible movement of the thoracic walls indicates labored breathing, and is always present in broncho-pneumonia. Great recession of the lower parts of the chest suggests some impediment to the entrance of air into the lungs. It should always be borne in mind, when examining an infant suspected of pulmonary disease, either acute or chronic, that the lungs may never have been fully expanded since birth ; or that a collapse of some portion of the lung may have occurred as the result of obstruction to the entrance of air from catarrhal inflammation. The possibility of a considerable portion of the respiratory apparatus remaining useless from birth, or becoming so afterwards, without any serious disease of these organs, is a most important element in the pathology of infancy and early childhood.

Indeed, the dyspnea, the hurried breathing, and many other symptoms which are referable to obstructed respiration may be, in a given case, not due at all to the beginning or progress of an inflammatory process, but to the non-expansion or imperfect expansion of the lungs.

Sometimes mere feebleness of the respiratory power is responsible for this failure of certain portions of the lung to participate in the respiratory act. The pulmonary cells are more and more emptied of air at each expiration, and the weakness of the chest-walls is such as to render their subsequent inflation impossible. Collapse of these lobules is the natural result. Where but a small portion of the lung is thus incapacitated, it is often difficult to diagnose the trouble ; but the breathing is more rapid than it should be, and there is no fever to indicate that an inflammatory process is going on.

Auscultation sheds but little light upon the case. Percussion, if carefully conducted, will afford more satisfactory results, for limited areas of dullness will be apparent. The chest of a child is more sonorous than that of an adult; that is to say, a more resonant sound is elicited when percussion is resorted to. In percussing the chest of a child, one finger should be laid firmly on the outer wall of the chest, while one or two fingers, held vertically, tap it slowly but lightly. In this way a good resonant sound should be elicited anywhere, although in children, as in adults, the apices and the scapular region vary much in resonance in conditions of perfect health. The stethoscope should always be used in auscultation of infants and children. The ear, however well trained, cannot be depended upon to detect those very limited areas of congestion or consolidation which are so partial in their distribution as to require for their detection that the chest be gone over inch by inch, and a careful comparison instituted between the two sides. It is well to remember, in making these examinations, that the pitch of both the inspiratory and expiratory sounds is higher in children than in adults. The intensity or sharpness of the respiratory murmur is what has given rise to the term "puerile respiration." This should not be confounded with tubular or bronchial breathing. In this case, the inspiratory sounds are shortened, and there is a distinct interval of silence between it and the expiratory sound, which is higher pitched, louder, and more prolonged. This is just the reverse of normal breathing. When there is pleuritic effusion in one side of the chest, it does not especially alter the respiratory murmur over this side, except at the apex, where it often gives rise to tubular breathing; but it is apt to intensify the puerile character of the respiration on the well side in a very misleading fashion. Unless care be exercised, the mistake is easily made of regarding this enhanced intensity of sound to disease of the well side, which can only be avoided by regarding the fixed or immobile condition of the parts actually involved by the pleurisy, and by a careful comparison of the percussion sounds of the two sides.

Another peculiar feature of disease involving the pulmonary tissues of infants, is the insidious manner with which it creeps along, or may creep along, sometimes rapidly, but at other times slowly, invading one portion of membrane after another, until a slight and localized inflammation, scarcely worthy of special notice, suddenly breaks out into a widely extending and serious affection. Thus, a trifling nasal catarrh may extend into the throat or into the trachea, and from thence into the bronchi; and a case of "snuffles" eventuates in a capillary bronchitis or a catarrhal pneumonia. The greatest care should be

taken, therefore, to watch the incipiency of all pulmonary affections occurring in early life, and so far as possible, prevent their extension by prompt and efficient treatment.

COUGH.

Cough is a symptom which, to a greater or less extent, accompanies all affections of the respiratory apparatus, but it is also a symptom of variable significance, and may be present to an annoying degree, independently of any pulmonary lesion. The stomach cough of children is traditional, and is caused by irritation of some fibers of the vagus. Other varieties of cough of a purely reflex character are by no means uncommon. Foreign bodies in the ear will excite a reflex cough, which disappears as soon as the cause is removed. Dry wax in the ear will produce the same phenomenon. Umbilical protrusion has been reported as the exciting cause of violent cough in a young infant, which was promptly relieved by replacement and compression. There are fairly well authenticated cases where the expulsion of tapeworm, (lumbrici), lumbricoids and other parasites from the alimentary canal, has caused the immediate arrest of a persistent and vexatious cough. One of the most frequent and troublesome of these reflex coughs met with in children is the so-called "night cough," which comes on with great regularity just before midnight. It is short, dry and evidently of an irritative character. It is believed to be of nasal origin, and is due to the presence of mucus in the nasal or naso-pharyngeal chambers. During the day, when the child is up and about, this mucus, then in a fluid state, escapes anteriorly; but in the recumbent posture it accumulates, and becoming dry, causes a turgescence of the posterior nasal erectile tissues, with the reflex phenomenon of cough. Follicular pharyngitis, acute and chronic, hypertrophy of the tonsils, so common in children, and an elongated uvula, will all give rise to cough, which is often paroxysmal, sometimes suffocative and always obstinate. A reflex cough, strikingly like that observed in pertussis, is occasionally caused by enlarged bronchial glands. This cough is noisy and paroxysmal, but is not attended by a whoop. This fact, and its non-appearance in epidemic form, affecting only a single individual, serves to differentiate it. The absence of any definite and distinctive stages, and the evidence of associated lung disease, also serve to remove any doubts that may exist as to its non-specific character. Enlarged bronchial glands have also a history of wasting long before the occurrence of the cough. The diagnosis of this affection is aided greatly by following the method of exam-

ination laid down by Eustace Smith. He says: "If the child be made to bend back the head, so that his face is almost horizontal, and the eyes look straight upwards at the ceiling above him, a venous hum, varying in intensity according to the size and position of the diseased glands, is heard with the stethoscope, placed upon the upper bone of the sternum. As the chin is now slowly depressed, the hum becomes less loudly audible, and ceases shortly before the head reaches its ordinary position."

However we may regard the philosophy of the production of the cough in a given case, or however puzzled the pathological condition underlying it, our practical ends are best subserved by finding a remedy that will relieve it. In some cases, where the pathological lesion is incurable, this will be hard to accomplish; but oftentimes a distressing cough, that in the nature of the case is incurable, may be ameliorated by finding a drug which gives rise in its pathogenesy to a cough of similar character.

To this end the following list of remedies and their indications will prove helpful.

REMEDIES.

Tight Cough.—Hepar sulph., phos., puls.

Dry.—Acon., bell., con. mac., gels., hyos., nux vom., phos., rumex., sepia.

Loose.—Ant. tart., hepar sulph., phos., calc. carb.

Rattling.—Arg. nit., ant. carb., ipecac, secale, sepia.

Deep.—Arg. nit., hyos., phos., sticta.

Racking.—China, eupat. perf., phos., secale, sepia, arn.

Hacking.—Puls., sepia, sulph., phos.

Titillating.—Am. carb., cham., auphras., hyos., ign., ipec., lauxoc., sepia.

Paroxysmal.—Bell., dros., cup. met., gels., hyos., ipecac, phos., cor. rub.

Moist.—Ant. tart., calc. carb., ipec., kali. bi., sulphur.

Nervous.—Acon., ambr., coff. crud., gels., hyos., ign., kali. brom., platina.

Spasmodic.—Badiaga, bell., cup. met., dros., gels., hyos., ipecac, mangan.

Barking.—Bell., bry., caust., acon.

Hoarse.—Hepar sulph., sticta., carbo. veg., ign.

Hollow.—Bry., acon., bell., nit. acid, spongia.

Wheezing.—Spongia, acon., bell., hyos.

Aggravation—Morning.—Apis, baryta carb., bry., calc. carb., calc. phos., caust., china, coff. crud., crocus, fer. met., ign., ipec.,

lach., nat. mur., nux vom., rhus tox., sang., sepia, silic., stram., thuja, am. carb.

At night.—Acon., alumina, ambra, ant. tart., apis, arg. nit., ars. alb., bell., bry., calc. carb., calc. phos., carbo veg., caust., cham.., china, conium, dros., fer., hyos., lycop., merc., sol., merc. corr., nit. ac., phos. ac., puls., silic., spong., sticta., thuja, verat. alb.

On eating.—Ant. crud., bry., calc. carb., calc. phos., china, conium, fer., hepar sulph., kali bi., lach., merc. corr., nux vom., phos. ac., puls., sepia.

On drinking.—Ant. crud., bell., calc. carb., china, fer., hepar sulph., ign., lach., opium, phos. ac., rhus tox., silic.

From excitement.—Nux vom.

From exercise.—Apis, calc. carb., china, kali bi., merc. sol., nat. mur., nit. ac., spong., stannum.

On motion.—Ant. crud., bell., bry., calc. carb., calc. phos., china, fer., gels., merc. corr., nux vom., rhus tox., sang., stannum.

From cold.—Ant. crud., bell., calc. carb., calc. phos., hepar, lach., merc. sol., phos. ac., rhus., silic., sulph.

From warmth.—Acon., ant. crud., apis, bell., bry., fer., lach., merc., sol., nat. mur., opium, phos., puls., sulph.

On lying down.—Acon., conium, dros., hyos., ign., kali. carb., merc., sol., nat. mur., nit. ac., phos., puls., silic., sticta.

SYMPTOMATOLOGY—SPECIAL INDICATIONS.

Aconite.—Especially in first stage; cough hoarse, dry and short, or loud, hard and ringing; fever, dry, hot skin; restlessness; child grasps throat when coughing; cough worse at night and better while lying quiet.

Arsenicum.—Fever, cold, clammy perspiration; great thirst; suffocative cough at night; cannot lie down; pale, waxy skin, with great prostration.

Belladonna.—Face red, head congested; cough is short, dry and violent, or spasmodic, hollow or barking; short, anxious, hurried breathing.

Causticum.—Cough dry, hollow and violent; worse in mornings and evenings, but better when warm in bed and from swallow of cold water; short, hurried, panting respiration, with involuntary discharge of urine and feces.

Chamomilla.—Child is peevish, fretful, variable mood; severe dry cough during sleep without awakening; paroxysms of suffocative cough at night; especially useful during dentition.

China.—Hoarse, tickling, spasmodic cough, worse at night, after eating, laughing or cold; prostration, without thirst.

Hepar sulph.—Cough deep, rough, barking, or hoarse and rattling; cough excited by cold, uncovering any portion of body, eating or drinking anything cold, and crying; cough worse in morning and better from warmth.

Gelsemium.—Paroxysms of hoarse, spasmodic cough; child is dull, languid and apathetic; excessively nervous; loss of appetite.

Ipecac.—Vomiting; long-lasting retching; cough causes vomiting; paroxysms of long-lasting, violent cough, until child loses its breath and gets blue in face; convulsions and spasms from cough.

Merc. sol.—Alternate heat and chilliness; great thirst for cold water; cough short, dry and ringing; worse at night and from drinking cold water.

Nux vom.—Fever, thirst, alternate diarrhea and constipation; dry, short, violent cough, worse at night; cough worse after eating, drinking, cold, and lying on the back; involuntary urination while coughing; especially useful after patent medicines and cough mixtures.

Phosphorus. — Emaciation, with weakness and prostration; cough tight, tickling and dry; loose, hollow and rattling; worse at night, from eating, laughing, motion and cold; better from rest and quiet.

Pulsatilla.—Inclination to stretch, yawn and throw off the clothes; chilliness, without thirst; cough dry and tight at night; loose during day; worse in evening and on lying down; better on sitting up.

Sulphur.—Child jumps, starts and screams; head hot and body cold; cough short, dry and violent; worse evenings and when lying down; hoarseness with hurried respiration.

Tartar Emetic.—Child wants to be carried, very restless and cries when touched; cough short, shrill, moist and rattling; cough causes suffocation, compelling patient to sit up; cough worse when lying down; is followed by gaping, dozing or crying.

Sambucus. — Rough, wheezing, suffocative cough, waking child about midnight; cough causes child to sit up, wheeze and gasp for breath, turn blue in the face; cough worse at night, and while at rest, but better while moving about; follows well after opium.

CHAPTER II.

CORYZA (NASAL CATARRH).

THE mucous membrane of the nares is exceedingly susceptible to catarrhal inflammation, and *coryza* is one of the most frequent of infantile maladies. In its most frequent form it is more a source of discomfort than danger; but it must not be regarded as a trifling disorder, for oftentimes a simple coryza paves the way for a more extended and serious disorder. It seems to be a well-established fact that diphtheria, laryngitis, pneumonitis, bronchitis and indeed all of the affections of the throat and lungs are most common in those who are the previous subjects of catarrh.

This statement is equally true of tuberculosis. Any impediment to the free entrance of air to the lungs; anything which embarrasses the respiratory function to any appreciable degree, is apt to lead to congestion, infarctions, and as a secondary effect, to glandular changes of more or less serious moment. We have already, under the head of General Considerations, spoken of the facility with which all inflammations of the mucous membrane lining the respiratory tract, spread and extend themselves; and a slight and inconsequential catarrh may terminate in a fatal laryngitis or a serious affection of pulmonary lining, or parenchyma. Some children seem to be much more subject to catarrhs than others. There are babies that "snuffle" from the first hour of their extra-uterine existence; while others, apparently no better cared for, seem to be almost exempt from colds and their consequences. Undoubtedly constitutional dyscrasia has much to do with this, for as a rule, children that are "always taking cold" are of a scrofulous or strumous habit. It must be admitted, however, that perfectly healthy children in all other respects, once the vitality is lowered by one of the eruptive fevers, or by an attack of indigestion, take cold very readily, and one cold is very prone to be followed by another, and another. During the period of dentition this is generally very apparent, for the teething process is exceedingly apt to be complicated by colds taken in endless repetition. Slight variations of temperature now induce catarrhal seizures; or even, independently of any such exciting cause, the mere approach of a tooth towards the

surface of the gum, often gives rise to its symptoms, which subside when the source of irritation ceases. As pointed out by West, such attacks often alternate with attacks of diarrhea, or the two co-exist; the symptoms of disturbance of the intestinal mucous membrane predominating at one time, those of disturbance of the respiratory membrane at another.

A large proportion of the ailments of infancy is the direct result of the extreme susceptibility of these two great mucous surfaces, and just as the flux of to-day may to-morrow take on symptoms of acute dysentery, so the catarrh of to-day may to-morrow have put on the grave features of acute bronchitis.

In the first stage of coryza the mucous membrane of the nasal passages is unusually dry, but this is quickly succeeded by a discharge, more or less copious, of glairy thin mucus, which after a time becomes altered in character; it is thicker, ichorous and puriform. In some cases, it becomes dry and forms thick crusts about the nostrils, which almost occlude the nares and render breathing through the nose an impossibility. Breathing by the mouth renders the tongue and throat dry and parched. Whenever breathing through the nose is seriously interfered with, a child at the breast is unable to suck, and as soon as it has seized the nipple it is compelled to let go, to avoid impending suffocation.

In this way the child is not only harassed by obstructed respiration, but in neglected or persistent cases, is worn out or exhausted by lack of nourishment. Such cases are extreme and exceptional, but they do occur, and in weaklings such a result should not be forgotton as among the possibilities. The cause of coryza is generally "taking cold," but other causes are well known to produce the same results, such as the inhalation of irritating vapors, steam, hot air and dust. A foreign body in the nose, such as a bean or a button, may also, by its presence, set up a most offensive and purulent discharge, baffling all the usual means of relief, until the foreign body is removed.

Coryza, as a complication or as a secondary complaint, is frequently met with in whooping cough, measles, scarlet fever, diphtheria and secondary syphilis.

Syphilitic coryza is often extremely intractable, and will seldom yield until the constitutional disease has been brought under subjection. A sharp coryza, it should be remembered, is very often the *avant courier* of measles, and rarely, although occasionally, is of diphtheritic origin, and may be so when there is no visible lesion in the pharynx or elsewhere. There is usually some slight febrile movement associated with acute coryza, and the infant or child is restless and fretful. In nursing babes the inability to suckle adds the pangs of hunger to the

other sources of discomfort, and in their frantic efforts to appease their appetites, the catching of the breath through the mouth often resembles an attack of laryngismus stridulous, and may be mistaken for acute laryngitis. In older children this, of course, does not occur, but even they often experience great difficulty in eating and drinking.

Treatment.—Whenever there is ground for suspicion—judging from the age of the child, or the character of the discharge—that the coryza may be due to mechanical obstruction other than inflammation and swelling, an examination of the anterior nasal chambers should be made by means of a small rubber ear-speculum or nasal dilator, into which a beam of strong light should be reflected. Such an examination may be rendered quite painless by inserting into the nostril a pledget of absorbent cotton, wet in a four-per-cent. solution of cocain. This should be left *in situ* for from five to seven minutes before the examination is begun. It will not do to apply the cocain by means of an atomizer, because it cannot be sufficiently localized in its anesthetic effect, and for the added reason that a toxic amount of it is liable to be thrown far enough back to be swallowed. If foreign bodies or neoplasms are discovered, they should, of course, be removed.

For simple catarrh, especially in young infants, little treatment is usually necessary. The nares should be carefully cleansed with warm water as often as they become obstructed, and a little goose grease, olive oil, or cosmoline should be smeared on the outside of the nose and lips, and inserted within the nares by means of a small pledget of cotton. All powders of an astringent nature, such as tannin, alum, nitrate of silver, sulphate of zinc, should be religiously abstained from; and the same should be said of all astringent washes or sprays. They are unnecessary, and do positive harm by irritating and congesting the already inflamed mucous membrane, and only make matters worse instead of better. Infants at the breast, and who are temporarily incapacitated from nursing, should be fed with a spoon until the stenosis is relieved. Those who are subject to frequent attacks of coryza from taking cold, should be made to wear constantly a light flannel cap, as suggested by Dr. Charles D. Meigs.

Children who are old enough, can be readily cured of either acute or chronic nasal catarrh, if uncomplicated, by the persistent use of a weak solution of *sea-salt*.

It is over twenty years since we read in a medical journal the experience of a French physician, whose name we have now forgotten, who noticed the beneficial effects to his patients suffering from catarrh, from visiting the seashore and bathing in

salt water. Taking the hint from numerous cures effected in this accidental way, he began using the sea water, which he had brought to him for the purpose at his home in the interior, and with a success that eclipsed all of his former efforts. Since that time, we have ourselves used a solution of sea-salt in our own practice, both with adults and with children of suitable age, and the treatment has been uniformly successful when faithfully carried out. It should always be used warm and the solution should be only strong enough to faintly taste of the salt. The treatment should be used several times daily, and should be continued until a cure is effected.

It may be used as a spray with an ordinary atomizer, after having cleansed the nostrils as far as possible with water as warm as can be comfortably borne. It will not do to use a douche with this or any other medicinal liquid, for the turbinated surface is too sensitive, and inflammation is liable to be excited, which will extend up the eustachian tube and involve the middle ear.

Hydrastis is a remedy of great value in coryza, and may be used in the manner spoken of above. The aqueous fluid extract (colorless) should be used for this purpose, one-half or two-thirds diluted with warm water.

The remedies which will be found most useful for internal administration in coryza, and which will often be found sufficient without resorting to local applications, are *allium cepa*, *arsenicum alb.*, *nux vomica*, *naphthalin ; sambucus*, *sulphur* and *tartar emetic*.

Special indications for the employment of each of these drugs is not deemed necessary. Their relative value and appropriateness in simple coryza will be found usually in about the order given above.

CHAPTER III.

EPISTAXIS.

NOSEBLEED is of very common occurrence in childhood, and arises from a multiplicity of causes. Indeed, the conditions under which it occurs are so various that it is impossible to enumerate them all. Some children suffer again and again, even when not otherwise out of sorts; and without any tendency to bleeding elsewhere. Sometimes, however, it serves to usher in some acute disorder, such as one of the exanthemata, pertussis or acute pneumonia. It is said that, with the single exception of the horse, man alone among animals is subject to this form of hemorrhage. In horses it is exceptional, and only occurs under the most violent exercise.

In childhood it occurs so frequently that there probably are few persons who have not at some period experienced it. At one time, and for a very considerable period in medical history, artificial blood-letting was advocated and supported by the statement that spontaneous bleeding from the nose was nature's safeguard against plethora; that it not only produced no appreciable harm, but, on the contrary, seemed salutary in its effects. Rhinoscopic examination of the nares of children, shortly after a hemorrhage, shows that in at least seventy-five per cent. of the cases, the bleeding takes place from certain fixed points or areas, which have been designated the "hemorrhagic points," or "points of predilection." Apparently these are points of least resistance. Blowing or picking the nose, vomiting, coughing, sneezing, are all liable to produce a sudden engorgement of the nasal mucous membrane, capillary rupture, and epistaxis. Nosebleed is rarely observed in the new-born or suckling, but becomes more common as the child advances toward puberty. Boys are said to be much more subject to epistaxis than girls, but this is probably due to their more boisterous play, and the more vigorous character of their exercise.

The prognosis in epistaxis is always good. Barthez, Rilliet, and Valliers, who have made a critical examination of a great number of recorded cases, have failed to find a single one of primary epistaxis in children that has proved fatal. In most cases

of this kind no treatment is necessary. The hemorrhage ceases spontaneously after a time in most cases by coagulation. If from any cause the density of the blood is diminished, and coagulation takes place slowly, a dangerous hemorrhage, attended by prostration, faintness, delirium, and cardiac weakness, may result in consequence. In such cases active measures, even to plugging the nostrils, if other means fail, must be resorted to. Rest in the sitting posture is of primary importance, with the head inclined slightly forward, as in writing. This position of the head places the floor of the nostrils in a horizontal plane, and prevents the flow of blood into the pharynx. The mind of the patient should be quieted, and all fear and excitement dispelled. The nostrils should be compressed, and all attempts to expel the clots prohibited. Ice water should be applied to the forehead and nape of the neck by means of compresses. Sometimes hot applications will answer better than cold. A piece of ice inserted into the bleeding nostril will often prove effectual. Galen's method of arresting nasal hemorrhage was to apply a large cupping glass to the hypochondria. The expedient is time-honored of making firm pressure upon the nostril or the septum with the finger of one hand, simultaneously elevating the arm of the affected side above the head.

The most effectual measure, however, in serious cases is to use some one of the well-known styptics, one of the best of which is a solution of the *perchloride of iron.*

The nose should first be cleansed of blood by injection of water, after which the perchloride should be sprayed into the nostril. The strength of the solution should be ℥ii to ℥ii of water. A tampon of cotton or charpie dipped in this same solution may be used in lieu of the spray.

A two to five per cent. solution of cocain sprayed into the nose or applied by means of small pledgets of cotton introduced gently into the nostril, is said to have checked some cases of most obstinate hemorrhage.

Therapeutics.—There are numerous remedies that are of reputed value in epistaxis when administered internally. Of these, the leading ones are *aconite*, *arnica*, *hamamelis*, *belladonna*, *china*, *erigeron*, and *ledum.*

The latter was the favorite of the late Dr. George E. Shipman. Dr. Gilchrist says: "In cases of epistaxis of almost any kind, erigeron has never failed me. I use the strong tincture, and administer it by olfaction. One or two smells of it has always sufficed."

In cases where the epistaxis is due to anemia or chlorosis, china or ferrum met. should be given, or perhaps still better, *ferrated cod-liver oil.* Dr. S. Hohn says that he has found the

fluid extract of *hydrastis canadensis* "a sovereign remedy in these cases;" he has had occasion to use it in a large number of cases of nosebleed in the German Poliklinik (New York), and has found it efficacious in preventing a recurrence in a large majority of cases. It is administered internally, in ten-drop doses in water, every two or three hours. "The hydrastis," he says, "is prescribed, be it understood, as a preventive for the patient who, at the time of his visit, is not bleeding from the nose, but who has a history of repeated bleedings."

A five-per-cent. solution of the fluid extract of hydrastis in water may be used as a spray for the nose; it may also be used with liquid *vaselin*, *albolin*, or kindred preparations, as a spray or brushed into the nose. The drug seems to "tone" the mucous membrane; and by reason of its containing a bitter principle it has, when taken internally, a beneficial effect on the stomach, as is attested by the improved appetite following its use; its only drawback is, that it has a tendency to cause constipation, but this may be combated by mild salines.

Dr. Hohn proceeds to give his own method of arresting nasal hemorrhage as follows: "It has seemed to the writer that the simple rules for the stoppage of capillary hemorrhage are applicable to these cases; the object is, as in any hemorrhage, to secure coagulation at the point of bleeding, and to keep the clot in place.

"The first rule, therefore, is to place the patient, and more especially the bleeding part, at rest; nervousness or fright should be quieted with assurances that there is absolutely no danger; the patient should sit upright in a chair, the head thrown slightly backward; all bands about the neck should be loosened, in order that the circulation may be unimpeded; the patient should then open the mouth as widely as possible, and should breathe through the mouth only; breathing through the nose should be entirely suspended until bleeding ceases, and should be superseded by oral breathing; blowing the nose, hawking, and spitting must be strictly interdicted; we all know how prone patients suffering from nosebleed are to do these things. In following the instructions thus far given, the interior of the nose is placed at rest, and the first indication is fulfilled; whereas, if the patient snuff up cold water, wipe or blow the nose, he displaces clots and favors the continuance of the hemorrhage.

"The second rule is to tell the patient, his mouth being kept wide open, to breathe more deeply and more rapidly than he normally does; the respiration may be increased to thirty per minute; the immediate effect of this increased oxygen supply is to increase the force and frequency of the heart's action, and

presumably to increase the amount of blood in the pulmonic circulation at the expense of the cerebral; whether it be due to the more thorough equalization of the blood supply to the body and head, or to the increased muscular action incident to the increased respiratory effort, it has seemed to the writer that the nasal mucous membrane is depleted to some extent by this procedure.

"The use of *opium* and *digitalis* in hemoptysis is to a certain extent attended by the same result here obtained, *viz.*, a more powerful contraction of the heart-muscles.

"As soon as the patient tires of the rapid breathing—which he does very soon, perhaps after thirty respirations—he may breathe normally for a few moments, when, if the bleeding has not ceased, he is told to breathe rapidly again; the mouth is to be kept open constantly, and any blood flowing into the pharynx to be swallowed.

"The fact that blood is withdrawn from the brain by this procedure is attested, in the opinion of the writer, by the dizziness which most patients experience when they resort to it, and by the pallor which the face assumes; the same symptoms have been noted by every physician during prolonged auscultatory examinations of the chest; some patients are apt to faint during such examinations; it seems to the writer that a temporary anemia of the brain is the cause of these phenomena.

"The final rule is, to tell the patient to enunciate the broad vowel 'A' with each expiration; the soft palate is thus brought in contact with the posterior wall of the pharynx during each expiration, the posterior nares are separated from the pharynx, and the blood is prevented from flowing into the esophagus during the expiratory periods.

"The three principal factors in this simple method of arresting nosebleed are, first: to place the nose at rest by suspending breathing through it; second: rapid and profound respiration, acting as a respiratory and cardiac stimulant, more equally distributing the blood throughout the systemic and pulmonary circulation by abstracting it from the head; and third: the occlusion of the posterior nares during the entire expiratory period by the intonation of the broad vowel 'A' during expiration.

"This method is so easily applicable that after every operation in the nose attended by bleeding the writer makes use of it; it is so much cleaner and simpler, after the snaring of a vascular polyp or the removal of an exostosis, to make use of this procedure than to apply astringents that interfere with the field of operation, that it is invariably tried by the writer before any other means are applied. Of course it may, in some

cases of severe bleeding from a larger vessel, fail; in these I would then try first the insufflation of tannin; and if this fail the tamponing of the nostril with long, narrow strips of iodoform gauze, dipped in the glycerite of tannin, with the ends hanging out of the nostril. It is needless to dwell on the advantages of a method of arresting nasal hemorrhage in which no drugs or instruments of any kind are necessary."

CHAPTER IV.

TONSILITIS (INFLAMMATION OF THE TONSILS).

THIS affection is sometimes called *quinsy* or *amygdalitis*. The tonsils are two almond-shaped glandular bodies situated in the mucous membrane at the sides of the base of the tongue, just between the two pillars of the fauces. When the mouth is opened widely they are thrown forward, and made more prominent by the tension of the posterior faucial pillars. They are of variable size, being sometimes nearly absent, and again are so large as to force the pillars of the fauces out of their usual position and make a mass of considerable size in front of the pharynx. In bilateral quinsy, they are sometimes so swollen as nearly to touch the uvula.

According to Lennox Browne, the tonsils, when normal, should not protrude beyond the plane of the anterior pillars. This variability in size may be considerable without occasioning any morbid symptoms, or producing any discomfort to the individual. The tonsils belong to the class of lymphatic glands. They are composed largely of connective tissue, in which are imbedded numerous follicles, compound in character, whose ducts open into one another, and terminate in ten or a dozen orifices of variable form. These orifices are plainly visible on the surface of the tonsil, and mark the entrances to the crypts or lacunæ. The arterial supply of the tonsil is abundant, and is in proportion to the size of the gland. It comes from the inferior pharyngeal and the two palatine arteries, and these branches are often so large as, when cut, to give rise to serious and even alarming hemorrhage.

The function of the tonsils has been a matter of much dispute, and is even now involved in uncertainty. The latest researches, however, indicate that their function is two-fold.

In the first place, the crypts or lacunæ, are reservoirs of a clear, viscid fluid, resembling in character that which is secreted by the small buccal glands. It is destined to lubricate the alimentary bolus and to facilitate its passage through the isthmus of the fauces and the esophagus.

In the second place, they contain numerous closed or ductless follicles, which are situated in the deeper layers of the tonsil; and in this respect they resemble other ductless or

blood glands, such as the lymphatic ganglia, the spleen, the thymus, etc., and, like them, they modify notably some of the constituents of the blood, and aid in the formation of the white corpuscles. The tonsils are, however, from a functional or physiological point of view, merely adjuncts of other organs, and bear but a minor part in the elaboration of the blood, and hence their extirpation does not lead to any serious disturbance of nutrition or materially affect the general health. It is in the bottom of the lacunæ, above mentioned, that those cheesy masses are formed which are so offensive in certain inflammations of the gland. These cheesy masses sometimes become hard and transformed into calculi. The tonsils are very prone to both acute and chronic inflammation. In the latter case, the inflammation nearly, but not quite always, results in more or less hypertrophy or enlargement of the gland.

In acute tonsilitis, occurring in early childhood, there does not seem to be the same tendency to suppuration that obtains later in life. I do not think I have ever seen a case of suppurative tonsilitis in a child under the age of puberty.

In childhood and youth tonsilar inflammation is very common, but not so common as in early adult life. It is rare in infancy, although enlargement of the tonsils is very frequently met with, even in very young infants.

Temperament seems to have much to do in the production of acute inflammation of the tonsils. It is most common among pale and lymphatic girls and boys. Enlargement or hypertrophy of the tonsils is very conducive to inflammation of these organs, and one attack renders the patient more liable to a recurrence. Such persons are very liable to sore throat from the slightest disturbance of stomach or bowels, or any undue exposure to cold or dampness. Tonsilitis is much more prevalent in seasons of rapid changes of temperature, such as are common in our variable climate during the spring and autumn. It is also a well-known fact that tonsilitis is more prevalent when measles, scarlatina and diphtheria are also prevailing. Among the direct causes of tonsilitis, the principal ones are undoubtedly the influence of cold and wet acting locally on the neck or feet. Sitting in a draught when warm and perspiring, getting the feet damp, neglecting to change the clothing after getting it wet ; these are unquestionably the most prolific causes of the disease.

Indirectly, certain atmospheric and local conditions probably predispose to tonsilitis, and the same may be said of septic influences, such as bad sewerage and the vitiated atmosphere of illy-ventilated homes. It is said by Kingston Fox that the differential diagnosis from acute tonsilitis, due to cold or other

simple causes, is made by the fact that the septic cases are bilateral in the beginning, while the others are unilateral, as a rule. There is so much evidence that bad sanitary influences participate in the causation of tonsilitis, that whenever a child is continually complaining of his throat, and the tonsils are the seat of repeated attacks of inflammation, it is almost certain that a careful inspection of the apartments will disclose the cause in defective drainage, or other unsanitary conditions. It goes without saying that when this is the case the producing cause must be removed before the child can be made permanently well, and future attacks averted.

Symptoms.—For convenience of description, tonsilitis may be divided into acute and chronic, the latter being attended with more or less permanent hypertrophy of the gland.

In the acute variety, the inflammation often begins with a chill, and is always attended with fever, the temperature ranging from 101° to as high as 103° Fahr. There is aching and soreness of the muscles generally, the same as is experienced in the beginning of a severe catarrh. The pulse is rapid and full, and the tongue is furred and red at the edges. There is headache. The tonsils are swollen and red, and there is much pain experienced when swallowing is attempted. An inspection of the throat reveals the fact that not only are the tonsils involved, but also the uvula, the pharynx and the pillars of the fauces. The uvula is not usually swollen at the commencement of the attack, but commonly becomes edematous later on. The pain experienced in deglutition increases as the disease progresses, until the child is afraid or unable to swallow, and any attempt to do so produces a muscular spasm, and a return of the fluid through the nose. The pain which accompanies deglutition is sharp in character, and it shoots up into the ears and side of the head. All movements of the jaws are painful. Singing or buzzing in the ears is often present, and adds another uncomfortable factor to the general suffering.

At the height of the disease the temperature is often as high as 104° Fahr. The skin is usually moist and clammy, and the face is anxious, haggard and distressed.

Fortunately for the patient, the pain and suffering are out of all proportion to the gravity of the disease, and after a few days, and in mild cases in a few hours, the distress is greatly ameliorated. In some cases, almost at the beginning, and in others after the lapse of a day or two, there is seen on the tonsils scattered spots or flecks of exudate from the lacunæ, each spot marking the orifice of one of the ducts. These exudations are grayish in color, and are often mixed with a glairy mucus, which covers to a greater or less extent the surface of the tonsil,

but does not dip into its recesses and become firmly adherent, like the exudative patch seen in diphtheria. Indeed, the filmy exudate which occurs in tonsilitis can be wiped off with a camel's-hair brush, and does not leave a raw, ulcerated, or bleeding surface underneath it. When there is considerable swelling of the tonsils, the voice is thickened, and assumes a characteristic nasal intonation. Besides the exudation on the tonsils, all of the muciparous glands of the mouth take on increased activity, and viscid, stringy mucus collects in the throat, which is expectorated with difficulty, and by very young children is swallowed. In cases where the disease is distinctly follicular—that is to say, when the exudate is scattered over the tonsil, marking the mouths of the crypts—the constitutional symptoms, such as fever, chills, pain and general malaise, are greater than in others where the inflammation is more superficial. Some authors make a distinction between these varieties—the superficial or the erythematous; and the follicular or lacunal; but there is in the writer's estimation little advantage in such a differentiation. The causes are precisely the same; the general symptoms are the same. The only difference, indeed, is that in the follicular variety of tonsilitis, the inflammation extends into the lacunæ, and involves the follicles to a greater extent than does the simple or erythematous, and in consequence, the fever is apt to be higher, and the other symptoms somewhat aggravated. It may be said, however, that in follicular tonsilitis, the exudation is apt to be more cheesy in character, and to project out from the follicular orifices, instead of forming a slimy or creamy patch over a considerable tonsilar area. There is another form of tonsilitis, called the *parenchymatous* or *suppurative*, which occasionally, though rarely, affects children. It is more common after puberty, and especially after maturity is reached. This is the so-called "quinsy" of the laity. In this variety of tonsilitis, all of the symptoms just described are intensified. The fever may, perhaps, be no higher, but the tonsils are more swollen; the pain in swallowing is greater, and there is often considerable dypsnea from occulsion of the throat from the intensely enlarged glands, which in severe cases nearly touch each other in the median line. The inflammation is so diffused, and involves to such an extent the pillars of the pharynx and the adjacent connective tissue, that it is almost impossible for the patient to open the mouth for inspection. Quinsy generally begins on one side; and after a period varying from three to five days, the opposite tonsil becomes involved. Where both tonsils are affected from the beginning, there may be great difficulty in breathing, and the general distress be very great. After the disease has run a course of from

five to seven days, a yellowish spot can sometimes be seen on the reddened and glossy surface of the gland, showing where the pus is most superficial. At this point the abscess will soon burst and a quantity of pus be discharged. As soon as this occurs, immediate relief is experienced; the fever abates, and in a few days the whole trouble is over.

Course and Duration.—Tonsilitis varies greatly in its course, gravity and duration. In its simplest form it may be so mild as to attract but little attention. A slight soreness of the throat, lasting for twenty-four or forty-eight hours, with but little fever and no constitutional symptoms, may constitute the whole attack. In cases of average or moderate severity, the duration of marked symptoms is from three to five days. When the inflammation of the tonsils goes on to suppuration, the duration is longer, for although it is unusual for both tonsils to suppurate during the same attack, it is quite common for the inflammation to extend to the opposite side, and in this way to prolong the disease. An attack of quinsy is rarely recovered from in less than from ten days to two weeks.

Abscess of the tonsils usually points anteriorly towards the buccal cavity, but in rare instances it has been known to evacuate itself posteriorly. While the abscess is in process of formation, the pains are of a lancinating character, and are accompanied by well-marked rigors. In children who have suffered from tonsilitis repeatedly, the glands are usually permanently enlarged.

Diagnosis.—The only trouble likely to be experienced in properly diagnosing tonsilitis is in distinguishing the follicular variety from a mild diphtheria. Sometimes this is extremely difficult. The exudation, which at first distinctly marked the orifices of the lacunæ, sometimes coalesces, and forms a consecutive patch of membrane that closely resembles the diphtheritic pellicle. If seen early in the attack, the diagnosis is simplified, for the exudate is then scattered and is whiter, while the exudate is more elevated or punctated. It is easily removed from the surface by means of a throat probang or brush, while the diphtheritic deposit is more gray, more adherent, and tougher, and, if forcibly removed, leaves behind a raw and bleeding surface. There is sometimes but little difference in the foulness of the odor that proceeds from the mouth in the two diseases. While that of diphtheria is usually more pungent and fetid, we have seen cases of tonsilitis where the breath was equally foul.

In determining the precise nature of a tonsilitis, we may have to wait until we can observe, for a few hours at least, the course and behavior of the exudation. That of diphtheria is

more rapid in its spread, and if it be detached, is rapidly reproduced. Dr. Lennox Browne has called attention to one point of differentiation between lacunal tonsilitis and diphtheria, which is of great practical help in doubtful cases, and so far as our own experience goes, it is a point well taken. He says: "The membrane in tonsilitis is limited to the tonsils themselves, whereas in diphtheria it is extremely rare not to see patches at the same time on the uvula and the soft palate."

Prognosis.—Except in extremely rare cases, the prognosis is always good. This statement, however, refers to the hazard to life only. Children of a debilitated and strumous constitution are much pulled down by it, and the outlook into the future is the more grave, because one attack is quite certain to be followed by others, and this tendency increases with every fresh outbreak.

Treatment.—The remedies which will be found of most value in the treatment of tonsilitis are *belladonna*, *kali bichromicum*, *tartar emetic*, and *mercurius*. In the milder form, and at the beginning of an attack, where there is intense redness, pain and tenderness, bell. will meet all the requirements of the case.

Where the exudation is considerable, and the mouth is filled with a viscid, glairy, stringy mucus, kali is to be preferred. In cases where the indications warrant it, the two remedies may be given in alternation. *Mercurius biniodide* is useful in cases where there is swelling of the external cervical glands, and outside tenderness in connection with the internal trouble. *Apis mel.* is indicated when the tonsilitis is of the superficial, or erythematous variety, accompanied with puffiness of the uvula, which looks like an inflated bladder, or a bag of jelly. *Hepar sulph.* is of value when suppuration is inevitable, but delayed.

The inhalation of steam is always grateful, and may be medicated with apple-vinegar or permanganate of potash, if there is much fetor to the breath. Cloths wrung out of hot water, or hot flaxseed poultices applied to the outside of the neck, will hasten suppuration where this cannot be avoided, and shorten the duration of suffering. As soon as a point is discovered where the abscess is disposed to break, a sharp-pointed bistoury should be used; the blade, all but its tip, having been previously wrapped with adhesive plaster in order to limit the depth of the incision.

CHRONIC TONSILITIS (HYPERTROPHY OF THE TONSILS).

This form of tonsilitis differs in many material respects from that which we have just considered. Repeated attacks of acute tonsilitis may, indeed, leave these glands hypertrophied, but

this is not always the case; the acute inflammation often having precisely the opposite effect, and leaving them shrivelled and atrophied.

Chronic hypertrophy is generally insidious in its approach and progress, and does not necessarily imply previous attacks of acute inflammation. It is sometimes congenital, or shows itself so soon after birth as to leave little ground to doubt of its hereditary origin.

This view of its etiology is confirmed by the family history, for it will be often found that other members of the family have suffered in the same manner, and very likely the parents will tell you that they themselves were thus afflicted in their early childhood. Some observers have endeavored to trace a connection between chronic tonsilitis and struma or rickets, but such efforts have not been substantiated by extended observations. Many cases will be met with where the tonsils are notably enlarged, and where there is a total absence of other indications of ill-health. In most cases chronic hypertrophy is of trifling import, or would be so but for the tendency, which is well marked in all cases, of predisposing to inflammations of these same organs of an acute and more serious character.

Once chronic enlargement of the tonsils has been established, every trifling disturbance of system or accidental exposure to cold, is sufficient to determine a new and acute inflammation, not of these glands alone, but of glands adjacent, and of the mucous membrane of the pharynx as well. In infants thus affected, the process of teething is frequently attended with more than the usual disturbances, and scarlatina and diphtheria are both apt to be complicated, if not encouraged, by this condition of chronic hypertrophy. The causes of this affection, aside from hereditary influence already referred to, are obscure. Delicate children with thick lips, and gross, ill-formed features, suggestive of the strumous constitution; and children who are particularly subject to disorders of digestion, are the favorite victims of chronic tonsilitis; and so are the children of the poor who live in basements, and who breathe a vitiated atmosphere, living upon poor and insufficient food, and deprived of sufficient sunlight. Tonsilar enlargement may manifest itself at any time succeeding birth, but is most commonly observed between the ages of two and ten years. Occasionally the child reaches puberty before attention is called to the disorder, and then it is quite naturally associated with sexual development. As regards sex, it is noticeably more frequent in boys than girls. The duration of chronic enlargement of the tonsils is indefinite. Some children undoubtedly outgrow it, owing to a better state of the general health, while the changes which take place at

puberty often exercise a salutary influence, and stop the increase, if they do not effect a permanent resolution. Indeed, in the majority of cases, after puberty the affection ceases to be a disease of importance, or to cause any special annoyance, for even if the tonsils are not materially diminished in size, the increased dimensions of the throat and fauces give more room, and thus relieve any discomfort there may have been.

It is stated by Bosworth that true hypertrophy of the tonsils never disappears, except by excision, and has a far greater tendency to increase than to remain *in statu quo*. The extent to which hypertrophy may go is very variable. In extreme cases the tonsils are so much enlarged that they touch the uvula on either side, and when this is the case the breathing is seriously interfered with. Usually the enlargement is only moderate in extent, and does not interfere seriously with respiration. It does, however, interfere with free vocalization and gives a nasal twang to the voice. Chronic coryza is frequently associated with chronic hypertrophy of the tonsils. When this condition of the tonsils exists, the glands are not only enlarged, but indurated. They have the appearance of light red or pink tumors, and if due to, and associated with, frequent attacks of acute inflammation, their surfaces are studded with depressions, or small excavations, rendering them uneven or somewhat honeycombed from ruptured follicles or congested and enlarged lacunæ. In other cases the surface is smooth and glistening. When pressed upon by the finger, the glands give a sensation of firmness and elasticity, which is due to the fact that the interfollicular and deep fibro-cellular tissue is increased. In rare cases, only a single tonsil is involved in chronic hypertrophy; more often both are similarly enlarged, although one may be more so than its fellow. The symptoms of enlargement of the tonsils are usually so apparent as to be unmistakable. If the enlargement is considerable, it causes the child to snore; it modifies the voice; and produces a frequent cough, and occasionally gives rise to deafness by the pressure on the eustachian tubes, and the associated hypertrophic or inflammatory changes which it invites in the surrounding mucous membrane. In some cases it so obstructs respiration as to distort the chest, which becomes "pigeon breasted," from the failure to properly inflate the lungs, and so oppose the influence on the ribs of outside atmospheric pressure.

Treatment.—The treatment of chronic hypertrophy of the tonsils is not very satisfactory. Whether this is due to the inefficiency of remedies, or to the lack of persistence in their employment, is an open question. In bad cases, undoubtedly

excision is the only reliable remedy, and time is wasted in procrastination. The fact that the disease is never fatal, and that as age advances there is a chance of spontaneous improvement, renders parents very repugnant to an operation that may be postponed or in course of time become unnecessary.

As the victims of the disease are generally weak and physically ill-favored, the first efforts given to amelioration or cure should be addressed to the general health.

The sanitary surroundings of the patient should be improved, and fresh air and sunshine recommended. The diet should be wholesome and nutritious. To children of the strumous habit, cod-liver oil should be given, with daily baths of salt water moderately cold, with brisk general frictions of the entire body. Everything should be done to improve the general health. In addition to this, it is said that much good may be accomplished by teaching the child to press upon the tonsils with the finger for a few minutes daily. In infants and young children this may be done by the mother or nurse. We have never had much success with local measures, such as painting the tonsils with iodine or astringent lotions.

We have had good results in some cases with the internal administration of *fucus ves.*, given in tincture of one to three drops three times daily, in sweetened water or on sugar. We have also seen good results in a few cases from *calc. iod. 3x* and *merc. iod. 3x*, given thrice daily, and kept up for many weeks. Where the chronic hypertrophy is accompanied with a discharge of cheesy and offensive matter from the tonsilar follicles, *kali bichromicum* is a useful medicine. Arndt and others speak highly of *baryta carb.* and *baryta iodatus.*

RETRO-PHARYNGEAL ABSCESS.

A very infrequent but occasionally occurring disease sometimes attacks the submucous tissues of the pharynx, and is attended with inflammation which results in the formation of pus. It is a disease that may occur at all ages, but is most commonly met with in young infants. In some cases the cause is traumatism, and follows a wound from swallowing bones, pins or other foreign substances. At other times the disease is idiopathic, and is due to cold affecting scrofulous or syphilitic subjects. The symptoms are not always well defined, and may be mistaken for those of enlarged tonsils. There is deep-seated pain in the pharynx, which is especially noticeable when swallowing is attempted. The neck is stiff, and the head is held on one side in a peculiar and fixed position. There are spasmodic

attacks of dyspnea, and sometimes there are convulsions. When the disease is idiopathic, it may develop in the course of forty-eight hours; but when it is secondary to scarlatina or acute pharyngitis, it generally takes from seven to ten days to develop. When occasioned by caries of the spine, its progress is still more slow and indefinite. The first noticeable symptoms are pain on deglutition, which becomes more pronounced as the disease progresses, until, if the abscess be large, swallowing is rendered impossible. An inspection of the throat reveals a round, bulging tumor in the fauces, which is firm and elastic to the touch. Sooner or later distinct fluctuation will be present, and as soon as this is apparent there should be no delay in opening the abscess and evacuating its contents. This is imperatively demanded, for if the abscess be permitted to open spontaneously, it may happen at inopportune times, as when the child is asleep, and pus be sucked into the lungs, causing death from suffocation. The incision should be vertical, with a guarded bistoury, all but the point being encased in strapping.

CHAPTER V.

LARYNGITIS (SPASMODIC CROUP, FALSE CROUP, CATARRHAL LARYNGITIS).

SPASMODIC LARYNGITIS.—This affection of the larynx is most frequently met with in children during first dentition, and especially during the second year of life. It is common, also, up to six or seven years of age, and the tendency to it sometimes persists till the fifteenth or sixteenth year. Like other inflammatory affections of the air-passages, it is most common during the cold months, and in changeable weather. It sometimes accompanies the eruptive fevers, and also bronchitis and pharyngitis. In the latter case it is due to an extension of the primary inflammation downward. Its remote causes are gastric derangements and heredity. Some families are very prone to it; and some children are subject to repeated attacks. We have a case in mind of a child who, from two to six years of age, had an attack of spasmodic croup whenever the wind veered around suddenly and blew from the east. The exciting cause is usually a sudden chilling of a portion of the body, or exposure to dampness and cold. It sometimes has no prodromal symptom, coming on suddenly toward midnight, after several hours of natural and undisturbed sleep.

More often, however, the attack is preceded by more or less coryza, and by hoarseness, which is apparent when the child cries, or if old enough, when it attempts to speak. Occasionally there is complete loss of voice, so that speech above a whisper is impossible. There may have been some cough during the preceding day, which tightens up as night approaches. But in a typical case, the child goes to bed without fever or anything in the way of ill-health to attract attention. After a short sleep, it awakens with a shrill, ringing cough, which is variously described as "brassy," or "clanging." There is more or less oppression about the chest, and difficulty of breathing. Inspiration is prolonged, stridulous, and crowing. The child exhibits fear and anxiety, wishes to be taken up, and if the breathing is much impeded, breaks out into a cold perspiration. If an attempt be made to speak, it is found that the voice is lost, and only a whisper remains. The dypsnea is often very great, but the gravity of the symptoms is out of all proportion

to that of the disease itself. The difficulty is manifestly spasmodic, for often the child will soon be appeased, the spasm passes away, and he drops off into a quiet sleep, which is interrupted again and again at variable intervals by a repetition of the "croupy cough." If left to itself, this experience will be repeated on the two suceeding nights, for spasmodic laryngitis inclines to run a course of three days. During this time the cough remains croupy, but gives but little trouble during the daytime. At the end of from three to five days, or sooner, the voice is quite restored, the cough disappears, and the child is quite well again.

Diagnosis.—The only disease that could be confounded with spasmodic laryngitis is that more formidable disease, to be described later on, *viz.:* true croup. In most cases, however, there need be no confusion. The sudden onset of the attack; the previous coryza; the absence of persistent inspiratory stridor, and the speedy subsidence of the momentary fear and restlessness, indicating a passing spasm, will serve to show that the disease is a transient and trivial disorder, and not one imperiling life from suffocation. This differential diagnosis will be made more plain when speaking of the graver disease.

Treatment.—These attacks frequently pass off after the usual exhibition of domestic remedies, one of the best of which is a half-teaspoonful of warm *vaselin.* This seldom fails to give prompt relief from the immediate spasm, and other and more scientific treatment can then be given to anticipate or prevent the attack on the succeeding night. As a prophylaxis, the child who is subject to spasmodic croup should be warmly clad and be kept in a warm, dry, sunny atmosphere.

While the attack is present, the child should be kept in bed in a warm room, and if the attack is at all obstinate, the air should be moistened with a steam atomizer or a bronchitis kettle. Flaxseed poultices or hot fomentations applied to the throat will help to shorten the paroxysm and prevent a speedy repetition.

In the matter of internal remedies, Bœnninghausen's *aconite*, *spongia* and *hepar sulphur* are famous the world over. Few cases will be found to resist them. The latter alone will often be found quite sufficient. *Kali bichromicum*, *ipecac*, *tartar emetic*, *bromin* and *sambucus* are also remedies that have their advocates, and may be used according to their indications.

CHRONIC LARYNGITIS is of very rare occurrence in childhood, and when it does occur, it is generally of syphilitic origin.

There is persistent hoarseness, sometimes amounting to aphonia. There is lacking the fever attendant upon acute

laryngitis, but otherwise the symptoms are similar, but of less severity, except as an acute attack is grafted into the chronic condition. When this is the case, the child is placed in great peril, and tracheotomy or intubation frequently offers the only recourse. There is always danger in these cases of permanent thickening of the laryngeal tissues, and of warty growths within the larynx. The treatment, aside from relieving the dyspnea by measures already mentioned, should be addressed to the dyscrasia underlying the local disease, as laid down under the head of Infantile Syphilis.

Laryngeal Spasm—Laryngismus Stridulus.—In addition to the laryngeal affections already mentioned, there is one occasionally met with in which there is no inflammation, and no local lesion discernible, and yet it is accompanied with great dyspnea and catching of the breath, and may even prove fatal. It is often associated with rickets, but may occur idiopathically. It is to all intents and purposes a nervous or spasmodic affection of the larynx, and involves more especially the glottis and epiglottis.

As Edmonds says, "It might with much propriety be called an asthma of the larynx." It is sometimes spoken of by authors and the laity as "internal convulsions."

The essential feature of the disease consists in the child holding its breath, or being unable to catch its breath, until the face becomes livid and suffocation seems inevitable. West thus describes an attack: "The child throws its head back, its face and lips become livid, or an ashy pallor surrounds the mouth, and slight convulsive movements pass over the muscles of the face; the chest is motionless and suffocation seems impending. But in a few moments the spasm yields, expiration is effected, and the crowing inspiration succeeds."

The crowing sound which thus terminates these attacks has given the disease the vulgar name of "child crowing."

The spasm is essentially reflex in its nature, and is frequently caused by some irritation of the mediastinal nerves. It is brought on by sudden excitement, or anything which hurries the breathing. The attack is associated with a sort of wheeze, which is something between the whoop of pertussis and the stridor of true croup. The attack may not last more than a minute, or even less, and the crow over, there is perhaps a fit of crying, when the child drops to sleep or goes on with its play as if nothing had happened. In some of these cases, there has been found to be an enlargement of the bronchial glands, but this is by no means uniform. The causes of laryngismus are various. It is so often associated with rickets that some

writers have stated that there is never one of these diseases without the other. This is certainly a mistake, for we have seen at least three cases in our private practice in which there was not the slightest indication of rickets.

Goodhart considers that this affection, or one quite analogous to it, which he calls "infantile spasm of the larynx," is due oftentimes to a "congenital recurvation of the epiglottis, which is a common thing in infancy and early childhood." Whatever the cause operating in a given case, the affection is not attended with the real danger that the symptoms indicate. When due to, or associated with, general convulsions, there is genuine danger, for there is not in such cases the same response to stimuli that is present when convulsions are absent. In most of these cases the spasms are ultimately outgrown, or disappear as the child becomes older, for the disease is purely infantile in its expression.

Treatment.—When laryngismus is associated with rickets, or enlarged bronchial glands, the treatment must have reference to the constitutional dyscrasia. Change of air, a sojourn at the seaside, *cod-liver oil*, *calc. phos.*, and remedies already mentioned under the head of Rickets, will be of service. For the relief of the spasm itself, the inhalation of some quick acting stimulant is required. *Nitrite of amyl*, *chloroform* or aromatic spirits of *ammonia* will answer the purpose. For internal administration, with a view of breaking up the habit and preventing a repetition of the spasms, *belladonna*, *hyoscyamus*, *cuprum* and especially *gelsemium*, will be found of value.

CHAPTER VI.

ACUTE MEMBRANOUS LARYNGITIS (PSEUDO-MEMBRANOUS LARYNGITIS); TRUE CROUP.

THIS form of laryngitis, commonly known as "membranous croup," differs from all other forms of laryngeal inflammation in being characterized by the formation within the larynx or trachea of a fibrinous pseudo-membrane. It occurs most frequently between the ages of two and twelve, but no age is completely exempt from it. It is rarely met with under six months of age, and is not common after puberty.

It is one of the most fatal of infantile diseases.

This form of laryngitis is so often associated with diphtheria that many authors refuse to consider it as having other than a diphtheritic origin. It is conceded on all hands that the diphtheritic membrane may originate in the larynx, or the trachea, without showing any exudation on the tonsils or on the fauces, and that many cases of croup are genuine cases of diphtheria. In other words, no one disputes the fact that there may be, and are, many cases of diphtheritic croup in which there are no other visible evidences of the disease than are afforded by the croupy manifestations.

When diphtheria has once manifested itself in the pharynx, and thence extended into larynx or trachea, there can be no question as to the nature of the inflammation there set up. But when the primary disease is below the epiglottis, and when there is an entire absence of any history of exposure to the diphtheritic contagium, the case is different. It is in such cases that the question arises—Is there such a thing as membranous laryngitis independent of diphtheria? Our own answer to the question is emphatically in the affirmative. We recognize two distinct and separate forms of croup—the specific and the non-specific; or, lest our words may be misunderstood, a diptheritic and a non-diphtheritic croup. Let the grounds for this belief be briefly stated. In the first place, it is a well-established fact that inflammation of the laryngeal and tracheal surface, whenever it reaches a certain grade of severity, is very sure to be attended by the exudation of fibrin and the formation of a pseudo-membrane. This has been repeatedly observed in cases of inflammation in these localities produced by the inhalation

of superheated steam, or hot smoke. Surely in such cases there could be no suspicion of specific origin. Then, again, we see cases of croup, with all its attendant phenomena, as a complication in measles, pertussis, scarlatina, and even in typhoid fever, when there is no indication whatever that there is a diphtheritic element present. The clinical history of the two diseases fails to bear out the theory that they are in any sense identical.

Diphtheria is adynamic or asthenic from the beginning, while croup becomes so only towards the termination of fatal cases. The one is contagious, the other is not.

Membranous croup always begins with decided laryngeal symptoms, and the attendant exudation is by preference in the larynx. If in membranous croup there be a visible exudate in the pharynx, or on the soft palate, or uvula, it is from an extension of the membrane upwards.

In diphtheria the membrane exhibits a preference for the pharynx, and it is generally, nearly always, hours or days before the exudation involves the larynx.

Diphtheritic croup is, therefore, a secondary affection, while true membranous croup is a primary one.

Diphtheria occurs endemically or epidemically, while croup is usually sporadic, affecting only here and there an individual and showing no contagious or infectious properties or tendencies. But the reader is referred to the chapter on Diphtheria, where the essential features of the two diseases are placed side by side in tabulated form. We cannot see how any unprejudiced mind can fail to discern the wide difference between the two in all essential particulars, or refuse to admit that there is a croup which is a local disease, non-specific, and quite distinct from the croup of diphtheria. It is with this latter that we have now to deal.

True croup is a disease of childhood rather than infancy, and yet infants are by no means exempt from its ravages. It is more common after the first year than before, and boys are said to be more often affected than girls, in the proportion of three to two. It is more prevalent in winter and spring than in summer and autumn.

A cold, damp wind, especially if from the east or northeast, greatly favors it. Unlike catarrhal or false croup, true croup does not tend to recur. Stiener, who has had an experience covering 100,000 cases, states that he has never known the disease to occur twice in the same individual. All clinical experience tends to show that the exciting cause of the disease is exposure to cold and dampness.

Symptoms.—The early symptoms of true croup are insidious.

The child may have a croupy cough for several days before there is any marked dyspnea; but a slight hoarseness or huskiness of voice, that is scarcely noticeable at first, increases from day to day, or perhaps from hour to hour, until, if unrelieved by medical treatment, there is complete aphonia.

In the early stages there is no fever to speak of, and the child plays about as usual during the day. At night, however, its sleep is disturbed by a ringing bark of a cough, which has a decided metallic or brassy sound. This cough recurs at irregular intervals, and there is a steady but slow progression of the hoarseness. There is a marked tendency to aggravation at or just before midnight, in this respect resembling simple or catarrhal laryngitis. In some cases the fauces are injected, either from the effects of the cough or from diffuse inflammation. As the disease progresses, the respirations become noisy and labored, the face becomes flushed and takes on a look of anxiety. An inspection of the chest will reveal the fact that at each inspiration the post-clavicular, supra-sternal and infra-mammary regions are depressed. The breathing becomes audible, and has a sawing sound that may be heard at a considerable distance. There is usually no coryza in these cases. On the contrary, the throat and nasal mucous membranes are usually dry and somewhat injected. Sometimes the redness is slight and sometimes quite marked. On the second or third day, the disease progressing all the time, the dyspnea increases, and there is some febrile movement, although at no time is the temperature high.

When the obstructive membrane in the larynx or trachea has reached a certain stage, the appearance of the child is very characteristic. Distress is pictured on every feature. The eyes stare; the face is red or by turns purple. The inspirations are prolonged, and decidedly stridulous. The child clutches at his throat, as if with his fingers he could aid his struggles for breath. Every effort at coughing produces a characteristic ringing sound, which, after a time, loses volume, until it is lost in a wheeze or becomes inaudible. The attacks of dyspnea are paroxysmal, and may last for a few moments, or in exceptional cases, for a half-hour or more. There is manifestly a recurrent spasm of the glottis, which adds to the distressful breathing. There is great restlessness after the respirations have become seriously embarrassed. The child is constantly changing position and place—now wanting to be carried, and now to be put back to bed. At intervals, suffocative attacks occur, when asphyxia seems to be inevitable. The inability to carry on the respiratory function at last produces its inevitable result, and the blood becomes loaded with carbonic acid. This is evi-

denced by the blueness of the lips, the pallor of the face, and the dullness of the sensibilities. The expression of the face loses its anxiety and fear, and a look of dullness and indifference takes their place. The respirations are more quiet and superficial. The stridor disappears, but there are frequent struggles for breath, followed by exhaustion and a lapse into a comatose or semi-comatose condition.

Dr. J. S. Mitchell, in his able monogram on this disease, published in Arndt's "System of Medicine," says under the head, Special Symptoms — Breathing: "The peculiar breathing of croup, which gives it its distinctive character, and which has the sound which is most dreaded by the parents and physician, is due to the fact that, notwithstanding the labored breathing, only a small quantity of air is able to pass through the narrow glottis. There is prolonged inspiration, and a wheezing, whistling snoring sound, sometimes heard for a long distance. It has a sibilant, tubular, metallic quality, and its pitch is high. In one case which was under my charge, it was scarcely possible to find any part of the house so distant that the distressing sound could not be heard. The expiration is marked, and accompanied by the rattling of mucus, and is distinguished from the sharper and sawing nature of the inspiratory sound, by its low tone and snoring quality. The breathing usually continues to manifest these characteristics from the time the second stage is reached until the end, or until there has been relief to the dyspnea.

"The *respiratory sounds* are also distinctive; they are notably deficient, but if, during the prevalence of dyspnea, they become increased in frequency, they are not effective. The supra-clavicular spaces are depressed during inspiration; the intercostal spaces do not bulge, nor do the chest walls expand to the normal extent. The inspiratory retraction, which has been before noticed, is significant of marked dyspnea. The febrile movement is not marked after the first or second day. The temperature may rise as high as 102° or 103°, but ordinarily it will be found to be about 100°, and on the third, or at least the fifth day, it will subside. In those cases where it is found up to 104° or 105 8-10°, we shall find that extensive bronchitis or pneumonia exists. The pulse, early, is full, hard, and from 120 to 130. In the second stage it continues at about this rate, except that during the suffocative spells it may rise 20 or 30 beats; in the last stage it becomes very rapid, 160, or even 180, small, compressible, and intermittent. A persistent high temperature is significant either of diphtheria or catarrhal laryngitis.

"The *dyspnea* is one of the evidences of the disease. It is the result of the laryngeal stenosis, and marks the advance of

the second stage. The respirations rise from 28 to 32 per minute, sometimes more; all the accessory muscles are brought into play. The child throws the head upward with each respiration, somewhat after the manner of the asthmatic. His whole efforts are bent on expanding the chest. The inspirations grow more labored as the laryngeal contraction increases; the mouth is opened widely. The alæ nasi now contract, and again are widely open; the larynx is depressed after each inspiration, and the cartilages of the lower ribs are drawn inwards.

"Different opinions have been expressed as to the cause of this dyspnea. Niemeyer has advanced the view that it is dependent mainly upon paralysis of the laryngeal muscles. He regards this paralysis as the result of the infiltration of the mucous and submucous tissues, which exerts pressure upon the muscles and renders them sodden and powerless. An important clinical fact is brought out by this consideration, for in paralysis of the laryngeal muscles inspiration is affected, being rendered prolonged and stridulous, while the expiration is easy; difficulty in both inspiration and expiration indicates that there is an exudation, or a contraction of the glottis from edema.

"I once had an opportunity to make a post-mortem examination in the case of a child that had died from a severe attack of false croup, which, throughout its history of eleven days, simulated constantly the symptoms of membranous croup, with the exception that there was at no time evidence of exudation. He had, however, every other symptom characteristic of membranous croup. The child died during one of the suffocative attacks. There was no evidence of any membrane in the larynx, nor was there any evidence of the severe dyspnea to which the child had been subjected; there was a slight trace of edema glottidis, but entirely insufficient to account for the dyspnea and prolonged stridor. The parts were not hyperemic, though, of course, this is explained by the well-known fact that the laryngeal mucous membrane is rich in elastic fibers, and we often find it free from hyperemia after death, when previous laryngoscopic examination had shown an intense degree of congestion. This case of stridor and dyspnea, which was worse upon inspiration, was undoubtedly due to inflammatory extension, so far affecting the muscles as to interfere with their proper action. There was no evidence that the difficulty was in any way due to central nervous lesion.

"Rudnicky * claims that the dyspnea of croup is due to lack of coördination of the respiratory movement from nervous irritation. He insists that there is a special disturbance of the

* Wirner, *Med. Wochenschrift*, Nos. 323, 324, 325, 1873.

nerves, and that it may be outside the larynx. He refers to the fact that the branches of the superior laryngeal and recurrent nerves have many ganglionic cells, which are provided before their separation into muscular subdivisions. They are true ganglia, from which distinct bands of nerve fibers may extend to the muscular layers of the larynx. Rudincky contends that Niemeyer's theory is not correct, as was evidenced from laryngoscopic examinations which he made, demonstrating that the vocal cords move as usual during the existence of croup, thus showing that there could be no paralysis. Ziemssen (vol. iv., p. 242), regards the dyspnea of croup as the combined result of several causes, acting together or in succession, the most common of which is, undoubtedly, a mechanical one, namely, the swollen, relaxed and intensely-congested state of the mucous membrane of the larynx, on the one hand, and the false membrane and muco-purulent secretion on the other. He says that everyone who has had frequent opportunities for observation after death of the anatomical changes in the larynx of children, and who considers how little is needed to block up the glottis in such patients, must be justified in inferring the intimate causal connection between the dyspnea of croup and the changes referred to. He cites cases in which the most marked dyspnea is observed in children during life, without any croupous membrane being found after death, and in which the anatomical changes are out of proportion to the symptoms of the stenosis ; he states that in more than one hundred cases of fatal croup among children, he has been always able to find the false membrane in the larynx, though, of course, more intensely and more widely developed in some cases than others. But the single case to which I have just referred, shows that a fatal dyspnea may obtain without the presence of slightest amount of exudation. This shows that even in true croup it is not necessary that the exudation must be the sole cause of the dyspnea, and we may reasonably believe that if we can control the edema and the spasm of the glottis, we may apprehend comparatively little danger from the exudate, unless its quantity be so great as to completely fill up the larynx.

"In one case, which I had the opportunity of examining through the kindness of Dr. S. P. Hedges, the larynx was completely filled with a tough, fibrous exudate, so that it would apparently have been impossible for the smallest quantity of air to enter. Indeed, it seemed as if the exudate and laryngeal structures were simply one solid mass.

"A therapeutic hint may be obtained here. The treatment undoubtedly should be directed more specially to the stenosis, with the presumption that it is the result of the edema of the

glottis and spasm of the glottis, rather than of the presence of the exudate. It is a well-known fact that after tracheotomy, the dyspnea sometimes continues as urgent as before, the larynx being then no longer a portion of the respiratory apparatus.

"*Remissions.*—These occur in those cases of croup which are characterized by a moderate course. There are instances where distinct remissions occur in the second stage. There is a marked improvement in the dyspnea, although it does not disappear wholly. There is also a remission of the cough, the voice becomes more natural, and we find an improvement in the general condition of the patient. The febrile movement is almost entirely gone, and the appetite partially or wholly returns, and there is a disposition to sleep. These remissions are very favorable, especially when they are attended by an exfoliation of a certain portion of the false membrane, which may be thrown off in small masses mingled with mucus, or in irregular masses, sometimes in the form of tubular casts of the part. If these exfoliations continue, the remissions indicate that there will probably be a favorable termination of the disease, there is a longer period between the suffocative spells; and the dyspnea is markedly diminished. The cough grows looser, and the expectoration of mucus, or a muco-purulent secretion mixed with the flakes of fibrin, increases. The voice becomes less and less hoarse, and the fever stops entirely, perspiration occurs, the patient becomes more cheerful and natural, and the case turns into one of simple laryngeal catarrh.

"But many times these remissions are delusive; the suffocative attacks occur after the remissions, being more severe than before. There is now a fresh exudation occurring, or a spasm of the glottis, or of the laryngeal muscles, which has given rise to it, and the dyspnea is increased through the special influences which are at work, and instead of the remissions, we have a disposition to pass into the stage of asphyxia, which is followed by a fatal termination of the case.

"*Complications.*—The most frequent complication is bronchial catarrh, but the diagnosis of its degree is exceedingly difficult. It has been found that the sibilant and sonorous râles, together with the pronounced mucous sounds, disappear immediately after the performance of tracheotomy, indicating that the congestion was simply a temporary one, due to the dyspnea. In yet other cases, after a free entrance of air to the lungs has been effected, the râles still continue as a very prominent feature. In such cases a coincident bronchitis has arisen from extension of the inflammatory process, and we may assume the existence of fibrinous exudation in various portions of the bronchi and bronchioles.

"The explanation of Niemeyer (Ziemssen, vol. IV, p. 251) seems hardly necessary. His view is that the pulmonary alveoli enlarge, when laryngeal stenosis has obtained, without the entrance of a sufficient quantity of air, thus resulting in the rarefaction of the air contained in the bronchi and alveoli. This rarefied air acts upon the bronchial mucous membrane and upon the walls of the alveoli, just as cupping does upon the skin, the result being congestion and increased exudation from the blood-vessels as the result of the diminished pressure upon the walls of the vessels. To our mind, the extension of the inflammatory process, as in other forms of catarrh, seems to be all the explanation required. Pneumonia occurs less frequently as a sequence of croup; when it exists, it may occur in the lobular form, not so often as a lobar pneumonia.

"Atelectasis may occur as a result of the asphyxiated stage of croup. The portions of the lung involved are usually the lower and posterior parts. Before death, their presence cannot be recognized readily by physical examination, unless they should involve a large portion of the lung, which is not usual. The less frequent complications are pulmonary apoplexy and gangrene of the lung. It is doubtful if the latter ever obtains in a case of true croup; the instances which have been noticed are undoubtedly the result of diphtheritic laryngitis.

"*Course and Termination.*—Croup ordinarily runs its course in from five to ten days. The severest cases of the fulminant variety may terminate fatally in from twenty-four to forty-eight hours. The full duration is from four to six days. Instances are on record in which the exudation of false membrane on the mucous surface of the larynx and bronchi continued for several weeks.

"*Pathology.*—In the first stage of the disease, the main feature is an intense hyperemia with its ordinary accompaniments. The mucous surface of the larynx is a bright-red color, and is considerably swollen and puffy. The exudate varies from a very thin pellicle, to a thick, firm, tenacious false membrane, which may entirely block up the larynx. Its color is a yellowish-white, sometimes brown or gray; it may be blackened from extravasation of blood; the transudation of blood may be sufficiently extensive to render it, in some instances, blood-streaked, or dotted with small clots. The exudate is but loosely adherent to the mucous surface, and may be readily detached; in other instances its attachment to the mucous surface is much more firm. It, however, has not the tendency of the diphtheritic exudate to extend into the mucous tissue, involving the mucous and submucous structures.

"While, as we have already said, this anatomical difference

does not warrant us in assuming its non-identity with diphtheria, it is, notwithstanding, a decidedly important link in the chain of evidence. The disposition of the exudate is to extend downwards rather than upwards. The early writers divided croup into the ascending and descending, and it is admitted that the tendency is manifestly downwards.

"It is easy to understand how quickly the dypsnea may be increased by the presence of the exudation in the bronchioles; even if the amount of membrane in the larynx should not be extensive, the cutting off the entrance of air to the alveoli, by the filling up of the bronchioles, adds promptly and effectively to the amount of dypsnea.

"The vocal cords are especially prone to be the seat of the exudate. A moderate amount of exudation at this point, therefore, the subglottic space being quite free, may induce dangerous asphyxia. The inner surface of the glottis is generally also involved to a marked extent. The tendency of the membrane is to reform, which constitutes one of the discouraging and dangerous features of croup. After the first exfoliation of the membrane in flakes or threads, or masses of considerable size, a second formation occurs, and even a third. How much this reformation is influenced by the active methods of treatment, locally and internally, which have been in use, is yet difficult to determine.

"Microscopically, the exudation is found to be made up of amorphous, or fibrillated fibrin, with numerous young cells. Chemically, it is shown to be coagulated fibrin, soluble in alkalies, and particularly in lime-water.

"*Diagnosis.*—The early diagnosis is attended with difficulty. It is impossible to designate true croup from a severe case of infantile laryngitis, or false croup, until the exudation has unmistakably appeared.

"The difficulty of laryngoscopic examination in children is much to be deplored, for if a view of the larynx could be obtained, an early and positive diagnosis could be made. Some of the cases of infantile laryngitis, as in the one already referred to, unfortunately present symptoms which render their differentiation from true croup entirely impossible. On the second or third day it is usually possible to make the diagnosis with accuracy, if careful attention is paid to all the points. One prominent diagnostic feature is, that in pseudo-croup there is a much greater amenability to treatment; there is not, usually, so strong a disposition to the continuance of the dypsnea; it is not so intense nor so prominent. In false croup the febrile movement is more readily controlled; there is not as much hoarseness, the voice is not as frequently lost, nor as harsh and

rough. Instead, also, of tending to grow hoarse on the second or third day, false croup is ameliorated, as a rule, on the second night, and largely disappears upon the third. The steady progress of the symptoms from the first should incline us to apprehend that we are dealing with a case of true croup.

"In false croup, the suffocative attacks do not occur so often, and are not so severe. Parents, and even physicians, often say that they have had children affected with several attacks of true croup; undoubtedly, such cases are those of severe infantile laryngitis without any exudation whatever.

"It may be mistaken for edema of the glottis, but if we note carefully the history of the case, and make a thorough examination, we can usually settle the diagnosis. Palpation, which can always be employed before the case has progressed far, will put us on the right track. Spasm of the glottis is more likely to be confounded with this affection, but its convulsive nature enables us to distinguish it. Between the paroxysms the child is perfectly well; there are no croupy sounds, no hoarseness, no stridor. In most instances, there is not in croup, or at least only very occasionally, a tendency to spasm of a carpopedal form.

"Foreign bodies in the larynx induce symptoms which greatly resemble croup. The child is taken with sudden stridor and dyspnea, together with hoarseness and a sense of obstruction to respiration. In these cases, also, the history usually enables us to make a diagnosis. We have already given the points of diagnosis between laryngeal diphtheritis and true croup.

"Injuries of the larynx and morbid growths of the larynx give rise to croupy symptoms, but the diagnosis of these affections is generally rendered easy by examination.

"*Prognosis.*—True croup is an exceedingly fatal disease. The fatality ranges from 23 to 75 per cent. There are some cases which seem to resist, from the start, all treatment, however carefully and judiciously applied. With the evidence which we have of its deadliness, the statement of Cohen, since he has used the treatment of inhalations of steam in a hot room, should be carefully noted.

"We cannot believe that healthy, robust children succumb as readily to the disease as do the feeble. Our view is emphatically that it is a disease of scrofulous children; that the strong and robust bear the brunt of it much more readily, and afford more hope of relief from treatment. A careful analysis of cases treated will show that the children attacked, who were, before, subject to enlarged glands and other manifestations of scrofulosis, succumb almost surely."

(It is very rare to see a fatal case of croup among children who have been accustomed to plenty of outdoor exercise and who are free from scrofulous and syphilitic taint. The children of robust constitution, even though subject to privation and neglect, are not the favorite victims. It prefers the weaklings, the hot-house plants, that are given every care and surrounded with every luxury; overfed, overclothed and kept indoors much of the time for fear of "taking cold." It is always the delicate, sensitive, pale-faced child who knows nothing about "roughing it," that falls an easy victim to croup.)

"The tendency to a fatal termination is increased by the occurrence of complication. If we have bronchitis or pneumonia supervening, the danger is greatly intensified. Even when the membrane is confined largely to the larynx, there is but a slight prospect of recovery, though, of course, it is better than if the membrane extends above or below. There is little hope when we find severe and continued dyspnea with suffocative attacks occurring often, febrile movement high, and the stenosis marked, and stupor present, in a greater or less degree, with an intermittent pulse.

"During the stage of asphyxia, it is generally the course for three paroxysms of collapse to occur. This clinical feature gives us an indication for tracheotomy, which should be promptly employed after the first attack of collapse. The patient will rally from this under the use of a small amount of stimulant, and then the operation can be performed.

"*Exudation.*—If there is any exudation on the pharynx, which my experience demonstrates to be somewhat rare, the true nature of the disease is certain; but the exudation is usually out of sight, and tends to extend downwards, and to involve the trachea and bronchi, even to the bronchioles, and all know the difficulty of laryngoscopic inspection in children. With a little tact, the use of the mirror in the throat with a a strong direct light may be effected in some instances; such an examination will readily show the exudation. If not seen, its presence may be assumed from the history and symptoms, and, later, we have the expulsion of the membrane in flakes or casts. The larynx, trachea, and bronchioles have all been implicated, as *post-mortem* examinations have shown. Sometimes only inspissated mucus is thrown off for awhile. If inspiration and expiration are equally affected, we may assume the presence of adventitious membrane; if, however, inspiration is difficult and expiration easy, we have merely a paralytic state of the glottis."

Treatment.—The value of moist air in cases of croup is recognized by all schools of practice. This can best be secured by using a steam atomizer, or a kettle of water kept boiling by

means of a spirit lamp, and limit the breathing-space of the patient by means of an improvised tent, erected over the whole, or upper portion of the bed. The vapor may be medicated with comp. tr. of benzoin, or carbolic acid, or still better, perhaps, with acetic acid.

Dr. S. J. Bunstead, in the *North American Practitioner* speaks very highly of vinegar, as a therapeutic resource, both in catarrhal and membranous croup. He uses it in the form of vapor, pouring the liquid into a bread-pan, and then putting into it bricks or flatirons heated in the stove. When introduced under the tent, the air soon becomes saturated with acetic vapor. The inhalation of the vapor from slacking lime, has, it is claimed, saved the lives of many patients.

The late Dr. Nicho. Francis Cooke never wearied of telling of a case of croup which occurred at one of the principal hotels in this city, and in the course of which *thirty barrels* of lime were used in this way, with successful results. Dr. Solis Cohen, of Philadelphia, claims to have saved every case of membranous laryngitis since he adopted the method of inhalations of steam in a heated room. His plan is to place the patient, after it is manifest there is an exudation, in a closed room heated to a temperature of 80° Fahr., which should be constantly maintained without intermission until the child is out of danger. The room is then surcharged with moisture by hanging pieces of cloth, or towels, wet with hot water, about the room. The water is placed upon the stove or grate, and by the placing of hot flatirons in pans of water, sufficient steam is generated to produce a considerable degree of moisture. It is claimed that by this process the exudate is softened and finally exfoliated.

During last summer, being called out of town for a few days, I was compelled to leave a child suffering from membranous croup with my friend, Dr. L. C. Grosvenor. The child had been ill for several days, and on the day I left the city was voiceless, and at times cyanotic. The respirations were very labored, and it seemed as if intubation would soon become necessary to prevent suffocation. On my return I found, somewhat to my surprise, that the child was making a good recovery, and no operative procedure had been necessary. I was informed by Prof. G. that on his first visit to the case he had instructed the parents to spray the child's throat with *peroxide of hydrogen*, which produced its characteristic effects when pus is present, and after a few hours, a complete cast of the larynx with tracheal branches was coughed up, with an immediate relief of all serious symptoms.

In this case there was at no time any visible exudation in the pharynx, or on the tonsils. The sick child was two-and-a-half

years old, and the family consisted, besides the parents, of two other children, one younger, and one older than the sick one, who were necessarily constantly in the sick room, as the family occupied a flat of but three rooms. Notwithstanding these other children lived in the same rooms, breathed the same air, and were constantly about the patient, they remained well. This fact was to my mind conclusive proof that there was nothing diphtheritic about the attack. It was a case of simple, non-specific membranous laryngitis. I can only explain the action of the peroxide on the supposition that there must have been a secretion of pus behind and beneath the membrane which was decomposed by the inhalation, with the effect of loosening and throwing off of the deposit in the manner described.

Dr. A. G. Beebe, of this city, whose conservatism of statement is well known, says that for twenty years past he has used with uninterrupted success, in the treatment of all forms of non-diphtheritic croup, a preparation of *iodide of lime*, as prepared by Billings, Clapp & Co., of Boston. It is a nearly black powder, and is given in doses of one-fourth to one-half grain of the crude drug at intervals of an hour, or if the symptoms are urgent, as often as every fifteen or thirty minutes for the first few doses. It should be continued until the dry, croupy cough gives place to a moist or catarrhal one, and until all danger of recurrence during the night has passed. It may be conveniently given mixed (not triturated) with sugar of milk, so as to make a convenient-sized dose, or it may be put into water; but as it is a very unstable preparation, it should be exposed to light and air as little as practicable.

The remedies which are especially homeopathic to membranous croup, are:

Aconite.—Useful especially in the early stages, where it may limit the extent and intensity of the inflammation, and thus abort the formation of membrane or lessen its amount.

Arsenicum.—Edema of the glottis, in pale and debilitated children; great restlessness; scanty urine; great dypsnea.

Bromin.—Cough dry and wheezy; dyspnea marked; expectoration scanty; aggravation in spite of aconite; hoarseness tending to aphonia.

Hepar Sulph.—Feeling as if there were a foreign body in the larynx; stitching pains from ear to ear; febrile movement marked; inspiration difficult, expiration easy; loose cough, but no expectoration; rattling of moist mucus; aggravation after midnight or towards morning.

Kali Bichromicum.—Gradual and insidious onset; at first only slight difficulty of breathing, which increases as the dis-

ease progresses ; hoarse voice, with constant paroxysmal cough ; tonsils and pharynx red and swollen ; tough, stringy mucus in mouth ; breath offensive ; especially adapted to diphtheritic cases, in which it covers better than any other remedy the totality of the symptoms. This remedy offers more hope than any other of softening the membrane and effecting its expulsion. The more the case resembles one of non-malignant diphtheria, the more clearly is it indicated, and is well adapted to those cases where the diphtheria has extended into the larynx and trachea.

Sanguinaria.—Sensation of swelling in the larynx, with expectoration of thick mucus ; aphonia ; tormenting, exhaustive cough ; severe cough, without expectoration ; dryness of throat, with feeling of fullness of larynx, as if swollen.

See also *belladonna*, *causticum*, *lactic acid*, *lycopodium* and *spongia*.

CHAPTER VII.

PNEUMONITIS (INFLAMMATION OF THE LUNGS).

SYNONYMS.—First, *Croupous Pneumonia; Lung Fever; Lobar Pneumonia.* Second, *Lobular Pneumonia; Catarrhal Pneumonia; Broncho-Pneumonia.*

It is rather to satisfy the demands of modern pathology than to subserve any material end, that the practice is here followed of dividing the pneumonias into lobar or croupous, and lobular or catarrhal pneumonia. While *post-mortem* examination of the lungs may reveal a marked distinction between the two varieties, the clinical differences observed during life are so vague and indefinite as to result rather in confusion than practical help. While acute lobar pneumonia is probably quite common in childhood, it does not usually run the typical course which it does when adults are affected. It partakes more often of the symptoms of the catarrhal form, whether an entire lobe is involved or only certain portions or lobules, and the diagnostician must be very expert who can say positively in a given case which he has to deal with. Goodhart, in his American edition of "Diseases of Children," edited by Starr, says: "Acute pneumonia, be it clinical, lobar, or lobular, seems to me to present such appearances in every case as make any distinction between the two forms, save one of degree, a very difficult matter." Nor are we aided in a practical way by the dictum of modern pathology, that lobar pneumonia is always "a specific, infectious, self-limited disease, giving rise to definite temporary pulmonary lesions;" * and broncho-pneumonia is an "acute inflammation of the bronchial lining membrane, which, by direct extension and mechanical phenomena incidental to the disease, involves the connective tissue, bronchioles and air cells."† It is quite probable that filthy and illy-ventilated homes, crowded tenements and damp basements may give rise to lobar pneumonia, and to that extent and in that sense, it is undoubtedly "infectious," but the same surroundings precisely may give rise, also, under certain other favoring conditions, to bronchitis, asthma, laryngitis, or to lobular pneumonia.

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* Francis Minot, in *Keating's Cyclopedia.*
† F. Gordon Morrill, *idem.*

The diagnosis between bronchitis and pneumonia in the adult is oftentimes exceedingly difficult, and with children impossible. The one is so intimately associated with the other that it requires a keen perception to discover where one leaves off and the other begins. There are those of the highest standing in the profession, and who are credited with having a very extended experience in pulmonary diseases, who fail to make any distinction between capillary bronchitis and certain forms of broncho-pneumonia. The distinction, when made, is of no practical value, either from a diagnostic, prognostic or therapeutic point of view.

The vital function of the lungs is to aërate and depurate the blood, and any impairment of this function is attended with consequences which are disastrous in direct proportion to the amount of impairment. If a bronchiole is plugged up so as to exclude the air from the pulmonary vesicle to which it leads, it makes no practical difference whether the plug is of mucus or fibrin ; and the same is true of the vesicle itself. In either case the function of the part involved, be it bronchial or vesical, is impaired, and the act of respiration is to this extent curtailed.

The etiology of the two varieties of pneumonia will only show "a distinction without a difference." While lobar and lobular pneumonia exhibit but trifling differences in their causation and symptoms, their morbid anatomy does show marked peculiarities, which seem to distinguish them one from the other, as we shall proceed to explain. In croupous pneumonia, the pathological anatomy does not differ materially from that of the adult.

There is, first, hyperemia or congestion ; next, solidification or hepatization, and then softening or liquefaction.

Suppuration and gangrene of the lung, which are often seen in the adult, are very rare in the pneumonias of infancy. The three principal stages are, as a rule, not clearly defined, and it is no unusual thing to find them all existing at the same time in the affected organ.

The first stage, or that of engorgement, is characterized by a darker color of the lung substance than is natural, and to the touch it conveys a doughy feeling, as if the lung was edematous. When cut, the lung tissue emits a frothy, bloody serum ; the frothy appearance being due to the admixture of air bubbles with the lighter or darker sanguinolent fluid. A portion of lung in this stage, if thrown into water, has sufficient air in it to keep it from sinking, and if lightly squeezed and washed, it can be restored to nearly its normal condition. The less air and more fluid found in the lung, the greater or more intense has been the inflammation. When the stage of hepatization is

reached, the tissues are of a brick-red color; there is a greater degree of solidity, and the affected portions of the lung are friable, resembling the liver, from which resemblance this stage derives its name. The hepatized lung is swollen, and often bears the imprint of the ribs on its surface. Slight pressure causes a very little bloody fluid to exude from the cut surface without a trace of air bubbles.

A section of the lung has a streaked or speckled appearance, which is due to the bronchi and their vessels, which have escaped the inflammation, and are, therefore, lighter colored. There are multitudes of minute elevations projecting from the cut surface, which are the alveoli distended with a viscid exudation. Under the microscope, this exudation is seen to be composed of a granular form of albuminoid matter, with red or white blood corpuscles, and an abundance of new cell-formations in the air vesicles. Sometimes fatty globules are seen, which are probably due to the fatty metamorphosis, which takes place prior to absorption of those products.

A hepatized lung will often be found to have increased to ten times its normal weight.

The morbid appearances of the third stage, or, as it sometimes is called, the stage of *gray hepatization*, are purely hypothetical. It is the stage of resolution; of absorption. Doubtless it retains many of the characteristics of the preceding stage. The color changes from dusky-red to granite-gray. It is still solid, granular and lacking air, and still sinks if thrown into water. But gradually the engorgement and infiltration undergo liquefaction and absorption. The fatty metamorphosis before alluded to doubtless assists in this process of resolution. Children do not expectorate, and during convalescence from pneumonia are generally troubled but little from mucus in the tubes. Under unfavorable conditions, hepatization may undergo a change into purulent infiltration, in which case recovery is possible, but often long delayed. When limited in extent, it may become surrounded by a wall of connective tissue, and gradually be eliminated by abscess formation. The pleura corresponding to the pulmonary lesion is generally more or less involved, and in severe cases, there is the usual accompaniment of exudation of plastic lymph or serum.

The morbid appearances of lobular or broncho-pneumonia differ somewhat from those just described, especially when occurring in children. There is, perhaps, a greater dissemination of the morbid changes. The bronchial mucous membrane is more involved, and pours forth an abundant secretion, which naturally finds its way to the most dependent portion of the lung, which in a sick child is posteriorly; and it is usually the

posterior portion of the lungs that is affected in broncho-pneumonia. The inflammatory process not being restricted, as in lobar pneumonia, spreads irregularly in various directions. It invades the bronchioles and air-cells, and spreads also outwardly to the bronchial walls, and the surrounding connective tissue. This extension of the inflammatory process and its results may be rapid, and equivalent to a simultaneous invasion of all the tissues involved; or it may be slow and gradual, occupying weeks or even months. The manner in which the inflammation may spread in broncho-pneumonia is either by the migration of the bronchial secretion, which acts as an irritant wherever it penetrates, or by the action of the original causes of the inflammation affecting different centers or foci, from which large portions of lung are involved by natural extension along the mucous surface.

In all cases of average duration and severity, there is danger of collapse of some of the air-cells, which in some instances is a formidable accident. In these cases the walls of the alveoli, not being distended with air, come into apposition and remain so, until in the course of the process of resolution the bronchioles are free and open to the ingress of the inspired air, when, under favoring circumstances, they resume again their normal size and function.

From this it will be seen that lobar pneumonia is, pathologically, a primary affection, affecting the parenchyma of the lung, and showing but little tendency to involve the bronchioles or the air vesicles; while lobular or broncho-pneumonia is, as a rule, a secondary affection, involving the bronchioles and the alveoli by an extension of inflammation along their mucous lining. Lobar pneumonia produces solidification of pulmonary tissue by blood stasis; lobular pneumonia, by incarcerated mucus, epithelium, pus or other products of inflammation originating in the tubes or their termini. Lobar pneumonia *may* be associated with bronchitis; lobular pneumonia is *always* so associated. The former always involves a whole lobe or lobes, or a goodly part thereof, while the latter may involve but small and scattered portions of a lobe or lobes; the one runs a brief and limited course, while the other, by migration of morbid secretions, or natural extension of inflammation, may perpetuate itself indefinitely.

When lobar pneumonia becomes chronic, it is because of a failure, either in part or in whole, of nature's efforts to dispose of the products of inflammation; but lobular pneumonia partakes of the characteristics of all catarrhal affections, and becomes chronic from the lowered tone of the tissue involved, and the inability of the patient to expel the catarrhal products.

From a clinical point of view, it is plain to be seen how impossible it is to distinguish in the majority of cases between an inflammation which is confined to the bronchioles or their terminal alveoli, and an inflammation just outside of these tissues. And it is just here where the intelligent homeopathic physician need suffer no confusion. To him the "*totality of the symptoms constitutes the disease*," and the remedy or drug which best covers this "totality of symptoms," is the one sought for and prescribed with serene confidence in its curative action.

Clinical History.—As a rule, pneumonia in children is not attended with prodromal symptoms. The chill which marks the onset of the disease in adults is generally lacking. If present at all, it is an ill-defined chilliness rather than a rigor, and of short duration. The early symptoms consist of cough, pain in the side, drowsiness, loss of appetite, and perhaps vomiting. Fever quickly follows, with flushed face, hot skin, restlessness, rapid pulse and accelerated breathing. In very young infants, convulsions are not uncommon. The temperature rapidly attains a height of 103°, or even 105°, and falls somewhat, ordinarily, as the second stage of the disease is reached.

The disease is now fully developed, and the physical signs show engorgement of certain portions of the lungs corresponding to the parts affected. The cough is more or less frequent, and if the pleura is much involved, is attended with pain. A deep flush is noticeable on one or both cheeks, and an herpetic eruption is often seen on the lips.

The breathing is hurried and shallow, and the nostrils dilate with each inspiration. The temperature is lowest in the morning, the thermometer registering 102° or 103° Fahr. It rises towards midday, and by evening may reach as high as 104°, or even 106°, in severe cases.

In broncho-pneumonia the temperature is subject to sudden variations. Every extension of inflammation involving any considerable number of fresh alveoli, is attended by a rise of fever. From this cause, the temperature may, in some cases, be higher in the morning than it is in the evening, or at midnight. When areas of considerable size collapse, the dyspnea increases, the temperature diminishes, and the cough may entirely cease. This is of bad omen. The countenance soon becomes livid, the pulse small and weak, and unless a radical change takes place for the better, death ensues in the course of twenty-four or thirty-six hours.

When the second stage has lasted for a period of from three to six days, in case a favorable change takes place, the temperature falls suddenly, the breathing becomes easier and a profuse sweat marks the crisis of the disease. This does not occur,

however, until the process set up by the inflammation is complete. In connection with the sweat, the patient usually experiences an inordinate flow of urine, or a diarrhea.

Vomiting is present to a greater or less extent in nearly one-half of all cases. When broncho-pneumonia complicates measles, it generally occurs during the eruptive stage of that disease, or at least begins before the rash has entirely faded. In such cases, it runs a brief course, and death or convalescence is reached within a week.

The duration of the different stages may be generalized as follows: The stage of engorgement lasts usually but a few hours; that of red hepatization takes twenty-four or forty-eight hours for the exudative process to complete itself, and two to four days for solidification to continue before absorption begins; the stage of gray hepatization is very apt to be terminated within a few days by death. In mild cases, the first stage may not progress to the development of inflammatory products, but may simply end by resolution. More commonly it goes on to hepatization, and then, instead of ending in purulent infiltration, it gives way to the reparative process of resolution or absorption. This stage of resolution lasts for from three to five days and may last for weeks. In cases in which disease does not progress favorably, the addition of threatening symptoms usually takes place about the third or fourth day. The temperature rises, the pulse becomes smaller and more frequent, and there is a marked increase in the difficulty of breathing. The patient cannot lie down, but must be propped up with pillows, while the act of respiration is performed laboriously. When cases are prolonged beyond five or six days, it has long been noticed that there is a decided tendency to ameliorate on certain other days. These critical days, as they are called, are commonly the seventh, eleventh, fourteenth and twentieth. There is great tendency in pneumonia to relapse, and relapses always find their subject more or less exhausted by the previous attack and less able to withstand the renewed shock of the inflammation.

Physical Signs and Symptoms.—The diagnosis of pneumonia in adults is greatly facilitated by our ability to examine the sputa, and by the light which is shed upon obscure cases by auscultation and percussion. In infancy and early childhood, we do not receive any aid from the sputum, for the reason that none of it is expectorated. What little is raised to the fauces is immediately swallowed, and passes into the stomach, there to produce disorders in the shape of gastric inflammation or more often diarrhea. In infancy the strength is not sufficient to dislodge and dispose of the products of pulmonary disease,

and this is one of the reasons why pneumonia is so perilous at this period of life. Owing to the limited areas affected in many cases of lobar pneumonia, and its position in the center of a lobe with healthy tissue all around it, it is sometimes late in the progress of a case before auscultation and percussion yield any satisfactory results. The difficulty of employing these aids to diagnosis, which are so valuable in treating adults, is enhanced by the willfulness or fright of the child, which refuses to be pacified long enough for anything like a careful and critical examination. In cases where auscultation can be made available, it points to more or less embarrassment in the atmospheric ingress and egress into the minute bronchial ramifications. This hindrance to respiration is at times the result of great engorgement and stasis of blood, and again it is due to large secretory accumulations, or to simple collapse of the air-cells. During the first stage, or stage of engorgement, it is not common to hear the fine crepitant râle which accompanies this condition in the adult. A moist râle is heard more frequently. During the first twelve hours, auscultation will give ordinarily the hissing or sibilant ronchus, from dryness of the mucous membrane from the inflammation; but this is soon replaced by a moist ronchus, caused by the excessive mucus secretion which is being poured into the tubes. Percussion is likely to yield better results than auscultation. A dull or flat sound is elicited over the affected areas, and pleuritic complication will be shown by wincing or other evidence of pain when certain portions of the chest are percussed, which will be confirmed by a careful comparison of the two sides. During the stage of hepatization, true bronchial respiration can be clearly heard, after which it is replaced by moist crepitation. For some days before bronchial respiration is heard, there is marked dullness on percussion, and this dullness can be detected for a considerable time after other signs of hepatization have disappeared. Vocal resonance is usually well marked all through the disease, but vocal fremitus is an uncertain sign, whether present or absent. When present only on one side, it has diagnostic value.

Much can be learned by the general attitude and behavior of a child sick with pneumonia. There is complete loss of appetite. The child will not eat. It is too busy trying to breathe in a satisfactory manner. It will drink water, but thirst is not usually urgent. There is great apathy and indifference, which proceeds from exhaustion. It will hold a toy in its hand perhaps for hours together, making no complaint and no requests. The attention can be diverted but momentarily from the task in hand, that of obtaining sufficient oxygen to sustain life. The

face wears an anxious look, and the alæ nasi work vigorously. There is retraction of the ribs and intercostal spaces, especially in the lower and lateral portions of the chest, and there is depression of the epigastrium. The deep flush on one or both cheeks is rarely absent, but when on one side only it does not necessarily correspond with that of the lung affected. Certain nervous symptoms are sometimes observed, but usually are not marked, nor are they characteristic of the disease. Mild delirium may be present, and in severe cases this may amount to acute mania. Persistent drowsiness or stupor are more common. The pulse is very rapid, rarely under one hundred and twenty, and sometimes one hundred and forty or fifty in the minute.

The breathing is also greatly increased in rapidity, there being sometimes as many as sixty, eighty or even one hundred respirations to the minute. The significance between the ratio of pulse to respiration we shall speak of in connection with bronchitis. The tongue is usually coated, but may be red and irritable about the edges. When the disease is prolonged, the mouth and tongue become dry, and sordes may collect on lips and teeth. Vomiting, as already stated, is not uncommon, but is not usually persistent. Diarrhea from intestinal catarrh is frequently met with and is sometimes very obstinate.

Lobar pneumonia usually terminates by crisis; lobular by lysis.

Etiology.—It is said that healthy children are quite as liable to attacks of pneumonia as are those who are cachectic. This is highly improbable. A healthy, rugged child is more likely to resist any and all noxious influences than one who is not so. Pneumonia is no exception to this rule.

The effect of bad or unsanitary influences, such as come from living in basements, unsewered localities, in houses newly plastered, and unhealthy surroundings generally, may be set down as among the predisposing causes. But, undoubtedly, exposure to cold, insufficient clothing, damp currents of air, together with dietetic irregularities, are mainly responsible as exciting causes. The disease is not contagious, although it may appear in epidemic form, from a large number of children being exposed at the same time to the same malign influence. Either one attack predisposes to others, or some children are much more susceptible to it than are others. It is no uncommon thing for a child to have repeated attacks. Various authorities are cited who have witnessed a repetition in the same individual of pneumonia as many as ten or more times, the first attack occurring in infancy.

Diagnosis.—The differential diagnosis between pneumonia

and bronchitis in the early stage of either disease is not easy. It may be said, however, that the early symptoms in the former are more intense as a rule than in the latter. The fever is higher and the dyspnea greater.

Between croupous and broncho-pneumonia the symptomatic line is not very clearly drawn, except in typical cases. There is more apt to be vomiting, chills, headache, delirium, or convulsions in the former than in the latter. Broncho-pneumonia is the form most likely to follow eruptive fevers, especially measles. Indeed, a previous history of measles, whooping cough, scarlatina or bronchitis makes lobular pneumonia probable rather than croupous.

A previous history of good health up to the time of seizure with pneumonia renders it probable that the attack is of the croupous variety. In the latter the ratio of pulse and respiration is steadier, that is to say, less subject to variations than the other. If the age of the child is under five years, the type of the pneumonia is more likely to be lobular than lobar, for it is during the period of dentition that broncho-pneumonia most frequently attacks children. After this period either form may occur. In lobar pneumonia the affection is usually confined to one lung, while the opposite is true of broncho-pneumonia. In one hundred and ninety-one cases cited by F. Gordon Morrill, evidences of consolidation in both lungs, were obtained in only six and three-tenths per cent. In lobar pneumonia, the upper lobes are more commonly affected than in the lobular variety, the latter being more indiscriminate in its preferences. The average duration of the disease is different in the two varieties; that of lobar being from a week to ten days, while in broncho-pneumonia it is indefinite, but much longer.

To recapitulate: pneumonia occurring under three years of age is ordinarily catarrhal, and is preceded by and accompanied with more or less bronchitis. It is the form which is most apt to be associated with measles, scarlatina and whooping cough. Lobar or croupous pneumonia, on the other hand, is more apt to be a primary disease; its beginning more abrupt, and its duration shorter. Whichever form of pneumonitis is present, the physical signs will show dullness on percussion, bronchophony and bronchial respiration of higher pitch and harsher than the normal vesicular murmur. In addition, there are always in typical cases the flushed cheek, the hurried breathing, quick pulse, indifference to food and pronounced apathy.

Prognosis.—Pneumonia is one of the most fatal of infantile maladies. No matter which form of the disease may be present in a given case, the child's life is imperilled. The nature of the affection is such that it strikes at the very citadel of

life. A child that cannot breathe cannot live; and the only reason that cases do recover is because only a portion of the lung structure is involved, instead of the whole. In croupous pneumonia sometimes only small areas of lung are involved, and at most, in ordinary cases, but a single lobe. The affected area is limited, and the consequent damage restricted. There is still enough unaffected pulmonary mucous surface to carry on the vital functions of oxygenation and depuration until resolution is accomplished. Hence the mortality in this form of pneumonia is but small, especially in healthy, robust subjects. Barthez publishes a table of two hundred and twelve cases of pneumonia occurring between the ages of two and fifteen years, with only two fatalities. But with catarrhal or broncho-pneumonia, the case is different. As we have seen, it is most frequent during the period of dentition, when the system is already under a strain, and it often occurs as a complication in diseases, like measles or whooping cough, which have already lowered the general tone of the system and lessened the powers of resistance. Many deaths from pneumonia result directly from exhaustion. Adults in the vigor of their maturity are able to raise and expel the morbid products of pulmonary inflammation before these products have had time to undergo putrefactive change; but infants and young children have neither the knowledge nor the power to rid themselves of these mischievous secretions. Hence the mortality from broncho-pneumonia is large, and the younger the subjects, other things being equal, the greater the mortality. Just what the ratio of deaths to cases is, is uncertain. Some authorities place it as high as fifty per cent. This is probably much too high in cases treated homeopathically. I have a record of twenty-two cases, with but three deaths. The average age of these cases was two and three-quarter years. All of them occurred in private practice.

Any exhaustive disease preceding or accompanying the pneumonia increases its danger, and the younger the child and more feeble the constitution, the less likelihood there is of recovery. Unfavorable symptoms are increasing rapidity and feebleness of the pulse, pallor of countenance, inability of the patient to support the head, showing inordinate weakness; refusal to notice or be amused with toys; absence of tears when crying; and the appearance of pemphigus on the face or elsewhere.

Symptoms on which a favorable prognosis may be based are moderate acceleration of pulse; retained ability to support the head; decided and permanent lowering of the temperature; desire for food; return of tears after they have been absent, etc. When the inflammation begins to abate, there is generally progressive improvement; but the danger of relapse must not

be forgotten, and supportive measures will be necessary to combat the tendency to asthenia.

Treatment.—The latter part of the last sentence should have been printed in italics or small capitals, the more to impress the young practitioner with one of the great dangers to be encountered in this disease. Before the benign help and influence of homeopathy came to the rescue of suffering humanity, bloodletting, mercurials, blisters, antimony, and other depressants carried off more victims than the inflammation itself. While the main dependence is to be placed on the indicated remedies, the tendency to exhaustion must not be lost sight of for a moment. Such diffusible stimulants as brandy, whisky, ammonia, etc., may avert impending suffocation, and give time for the chosen remedy to act.

We have seen such salutary results from the judicious use of hot fomentations of the chest with flannel wrung out of hot water and hot poultices of linseed meal, that we would not treat a case of capillary bronchitis or pneumonia without one or the other of them. Poultices are preferable, because they retain their heat longer, and do not wet the clothing. They should be covered, as soon as applied, with a layer of oil-silk, in order to retain the heat as long as possible, and they should be changed or re-applied as soon as cool.

Internal Remedies.—These are not very numerous, but are wonderfully effective. We shall drop the alphabetical arrangement of drugs here and name them, for better perspicuity, in the order of their relative value.

Tartar Emetic.— In well-established cases, especially of broncho-pneumonia, this remedy is paramount to all others. It comes the nearest to being a true similimum to all of the essential features of the disease, *viz.*, loose, mucus cough; great oppression in breathing; quick, hurried respiration; crepitant râle; mucus ronchus; great anxiety of countenance; vomiting; anorexia. It should be given in the third decimal trituration, two to three grains in a tumbler half filled with water, of which a teaspoonful may be given every hour, half-hour, or in urgent cases, every fifteen minutes, until symptoms ameliorate.

Phosphorus.—Incessant, short, dry, hacking cough; scant secretion in the bronchi; crepitant râle; dryness of air passages; bronchial respiration; collapse of lung; short, laborious breathing; rapid prostration; sunken features; dry lips and tongue; involuntary diarrhea; threatened paralysis of lungs; hepatization of the lower half of right lung. Pleuro-pneumonia, with extensive implication of the pleura. (Bry.) "Phosphorus is our great tonic to the heart and lungs."—*Lilienthal.*

Aconite.—First stage, hot, dry skin; arterial thrill; sibilant ronchus; hasty respiration; agitated manner; pulmonary hyperemia; percussion sound still clear and crepitating râles distinctly audible. Aconite is of little use after stage of hepatization is fully inaugurated.

Gelsemium.—High fever *without thirst;* intermittent paroxysms of hoarseness, and voice becomes very weak; *sighing respiration;* local pains on both sides under scapula; especially valuable in pneumonia following eruption of measles; pulse slow and full; short paroxysms of pain in superior part of right lung, on taking a deep breath; nausea, vomiting.

Bryonia.—Great dyspnea, aggravated by the slightest motion; pleuro-pneumonia; short, jerky, incomplete respiration; thoracic tenderness; tongue foul; gastric catarrh; thirst for large quantities of water; abdominal breathing; inclination to lie perfectly still.

Cuprum.—Pneumonia complicating whooping cough; beginning paralysis of lungs with sudden difficulty of breathing, which is followed by great prostration; the face is earthy, dirty-bluish; roof of mouth red. There may be diarrhea, connected with sour-smelling perspiration (Deschere), when formation of abscess threatens.

Cannabis Sativa.—Constant delirium during the fever, with hard, teasing, sometimes incessant cough (phos.), and vomiting of bilious, greenish matter; the pulse is weak, frequently almost imperceptible; violent palpitation of the heart on moving the body. Lobar pneumonia: lung lesion limited to one lobe or to one side.

Opium.—Pulmonary inflammation disguised by symptoms of cerebral congestion and oppression; cyanotic color of upper part of body, with slow, stertorous breathing; anxious sleep with starts (bell.); hot perspiration all over the body, except lower limbs; parts covered by a heavy crop of sudamina. The patient gropes with his hands around the bed as though he were hunting for something.—*Hoyne.*

Sanguinaria.—This remedy, according to Hale, occupies a middle ground between tartar emetic and phosphorus. Dr. Hale says of it, in this connection: "It has many symptoms in common with both, and others possessed by neither. The general symptoms indicating sanguinaria are extreme dyspnea, short, accelerated, constrained breathing; the pulse is quick and small, the face and extremities are inclined to be cold, or the hands and feet burning hot, with circumscribed redness and burning heat of the cheeks, especially in the afternoon. The patient lies upon the back and is most comfortable with the head elevated; the dry cough will awaken the patient out of

sleep, and will not cease until he sits up in bed. There is frequent gaping after the cough."

Belladonna, hyoscyamus, are the chief remedies for the delirium which so frequently complicates pneumonia, when it is due to arterial or venous congestion. They can be considered merely as intercurrent remedies, when the upper portion of the lung is involved and the delirium is directly referable to circulatory disturbance, and not to blood change, and especially if the head symptoms are prominent from the start. Belladonna may be given at once, and with better effect than *aconite*. Hyoscyamus is especially valuable in hypostatic pneumonia, with delirium, not so violent in form as that of belladonna. There is less congestion, but more nervous excitement, with talkativeness and hallucinations, under hyoscyamus.

Mercurius.—General flagging of vital energies; dullness over lung on percussion; absence of respiratory murmur and crepitant râles; bronchial ronchus; livid expression of countenance. All these symptoms indicate consolidation of the part involved. The cough in bell., hyos. and mercurius is in all three remedies aggravated at night. Besides the remedies here enumerated, attention is called to *veratrum viride, digitalis, ipecac, kali bichromicum, kali carbonicum, cina, spongia, lycopodium, etc.*

CHAPTER VIII.

BRONCHITIS (BRONCHIAL CATARRH).

Definition.—Bronchitis is an inflammation of the mucous lining of the bronchial tubes, attended with more or less exudation of mucus in excess of normal requirements. It may be either acute or chronic. When it affects the bronchioles, which are the ultimate divisions of the bronchial tree from which the air cells begin to be given off, it is called "capillary bronchitis." This form of bronchitis will be treated of in a separate section.

Etiology. — Whatever confusion and murkiness may have clouded the etiological atmosphere surrounding pneumonitis, are dispelled when we come to consider the causes producing an inflammation of the bronchial tubes. All mucous membranes everywhere are liable to congestion and inflammation from the effects of cold, dampness and dust, or anything, in fact, which may set up an irritation in their surfaces. We have cystitis from acrid kidney secretions; diarrhea from the inhibition of indigestible food, or from the effect of cold and dampness, checking the exhalations from the skin and forcing them to find an exit through the intestinal mucous membranes. The relations between the skin and the bronchial lining are still more close and intimate, and any shock to the skin is liable to be felt at once by the pulmonary mucous lining. A slight draught, a sudden, although slight change in the temperature, will often excite irritation in the schneiderian membrane, and cause sneezing, which may be the commencement of an acute coryza, an angina or a bronchitis. Steady, dry cold does not seem to act as a cause of pulmonary inflammation, as it is said to be a rare complaint in the arctic regions in winter. Along the sea-coast and in our lake regions, catarrhs of all kinds are endemic, but are of most frequent occurrence during the spring and autumn months, when the atmosphere is often saturated with moisture, and the temperature is subject to sudden and marked variations. Superheated houses, by relaxing the skin and causing draughts, are hot-beds of catarrh. There is always more danger from excessive than from deficient heating of homes. Impure air, from whatever source, or however produced, is an

irritant to the respiratory mucous membranes, and paves the way for bronchitis or pneumonia.

The period of first dentition is one during which children are especially liable to catarrhs of all kinds. The respiratory tract affords no exception to the rule.

A cold in the head, or a mild laryngitis, if neglected, is very liable to creep along down into the bronchi and develop there an inflammation of greater or less extent. Certain diseases, such as the eruptive fevers (notably measles), which alter the quality of the blood and reduce the general tone of the system, are very often accompanied or followed by bronchitis. Indeed, it may be said that more or less bronchitis is always associated with measles. Whooping cough is also usually accompanied with some catarrh of the bronchial mucous membrane. Doubtless there are other causes of bronchial inflammation, of which we know little or nothing, such as electrical and telluric disturbances, barometric changes, and the like, which at times make such trouble epidemic. With so many etiological factors as those well known and generally recognized, it is no wonder that bronchitis is one of the commonest affections of childhood. It is most commonly met with as a disease of the large and medium-sized tubes, and as such we shall consider it here.

Symptoms.—In many, perhaps most, cases of bronchitis occurring in children under five, there is an accompanying or preceding catarrh of nose and throat. Its onset may, however, be sudden and without warning or complication. There is high fever (102° or 103°), labored breathing, quick pulse and a frequent short, dry, hacking cough, which subsequently becomes moist and rattling. The tongue is thickly furred. In nursing babies the coryza obstructs the breathing power, and makes them constantly let go the nipple to take breath. It is said that a child that can scream long and loud cannot have pneumonia ; and it is equally true that an infant who can nurse without interruption on account of "catching the breath," cannot have bronchitis.

Bronchitis of mild type, that in which only the larger bronchial tubes are affected, is common to all periods of infancy and childhood. In the beginning, the respiration and pulse are scarcely accelerated, and the appetite is but little impaired. Auscultation in these mild cases reveals coarse mucus râles in the larger bronchial tubes, while the smaller ones are free from mucus. Sibilant and sonorous râles are also observed, especially in the commencement of the disease, when the secretion of mucus is suppressed or scanty. By the second or third day, and usually sooner under appropriate treatment, the cough

becomes looser and the sputa, if obtainable, will be found to consist of frothy mucus, with an admixture of pus and epithelial cells. As the disease continues, the pus becomes more abundant. The duration of these symptoms may be from two or three days to a week or more. In rare instances the bronchitis fails to yield to treatment, and takes on a chronic form which may last indefinitely. The disease may be either primary—that is, unassociated with any other disease—or it may be secondary to coryza, laryngitis, pharyngitis ; to measles, whooping cough, or any of the continued or remittent fevers.

Prognosis.—When bronchitis is confined to the larger or medium-sized tubes, is uncomplicated, and occurs in a previously healthy child, having good surroundings and good care, the prognosis is always favorable. In other cases, with poor surroundings and poor care, and occurring in a child already enfeebled by acute or chronic disorders, the prognosis should be guarded. It should not be forgotten that there is always danger of a mild and simple bronchitis extending into the bronchioles and the alveoli, and producing or becoming that much more serious malady, capillary bronchitis, or, as some authors prefer to call it, broncho-pneumonia.

Diagnosis.—The diagnosis of bronchitis is usually unattended with difficulty. The respiration is not hurried and labored, as it is in pneumonia. Auscultation discovers coarse mucus râles, if the larger tubes are involved, and fine, subcrepitant râles, if the smaller tubes are affected. Percussion gives clear resonance on both sides, except in those cases in which collapse of lung or pneumonia has superseded. The absence of hoarseness, stridulous inspiration, and croupy cough distinguishes it from laryngitis ; and the stitch-like pain which belongs to pleurisy is wanting.

Treatment.—To go over the list of remedies suitable for bronchitis, would be to reiterate what has already been said in the previous section and in the remarks introducing the subject of respiratory diseases. The reader is referred particularly to pages 512, 514, where the repertory of cough remedies is very full and complete. There are no special remedies for bronchitis that have not been already mentioned and their special indications pointed out. Whatever omission there may be, if any, in these previous sections, will be supplied in the following section on Capillary Bronchitis.

In saying this, it must not be inferred that the simple form of bronchitis here considered, is unworthy of serious and careful treatment. On the contrary, a mild and apparently innocent inflammatory catarrh of the large and medium-sized tubes may, if neglected, extend to the bronchioles and the air cells,

and speedily result in a broncho-pneumonia of serious aspect, or take on a chronic form, with its possibilities of eventuating in phthisis pulmonalis, asthma, emphysema, or collapse of the lungs (atelectasis).

CAPILLARY BRONCHITIS.

This term is used to indicate a form of bronchitis affecting principally the finer or finest ramifications of the bronchial tree, just before the air vesicles, or alveoli, are given off.

The term is objected to by some hypercritical authorities, who have suggested, as more indicative of its morbid anatomy, the term "bronchiolitis;" others have endeavored to substitute the term "terminal bronchitis" as more expressive and correct. To our own mind, neither of these expressions is less open to criticism than that of capillary bronchitis. In many cases where the bronchioles are manifestly affected, the inflammatory process stops short of the termini, in which cases "terminal" bronchitis would not apply. "Bronchiolitis" is perhaps less objectionable, but we can see no particular advantage in substituting a new term for an old and time-honored one, when the one is just as definite and comprehensive as the other.

Retaining then, the old term, capillary bronchitis, out of respect for its age, if nothing more, let us see what the term implies.

We have already seen pointed out that in the ordinary and simple form of bronchitis, affecting the large or medium-sized tubes, we have an inflammation of the mucous lining of these tubes, eventuating in a catarrhal effusion upon the tubular surfaces, attended by cough and expectoration. There is no obstruction to respiration, or next to none, because the caliber of the affected tubes is not completely filled by the effused mucus. In other words, there is no stenosis or occlusion. When, however, the minute bronchioles are invaded, the case is very different. On account of the narrowness of the tube, the inflammatory swelling of the lining membrane of the bronchioles is sufficient alone to produce suffocative attacks (bronchitis sicca). In these finer air tubes, mucus or pus has precisely the same effect as dense fibrinous material has in the larger tubes. Air cannot penetrate beyond the obstruction and enter the air vesicles, which are almost certain to collapse in consequence. In case the air cells do not collapse, the contiguous inflammation is tolerably sure to invade them, with consequent exudation and infiltration. The inspired air cannot reach the blood, and decarbonization of this fluid is as effectually arrested as if the larynx or trachea were plugged with a pseudo-membrane.

The danger from capillary bronchitis is in direct proportion to the number of bronchioles affected. From a pathological standpoint, capillary bronchitis and simple bronchitis are precisely the same thing; the latter affecting the larger or medium tubes, the former affecting the smaller and finer. There is no difference at all in the process, except one of grade. Capillary bronchitis is essentially a disease of infancy. It may be primary, the bronchioles being involved from the start; or it may arise from extension of the inflammation, which has primarily affected the larger tubes.

Symptoms and Course.—In capillary bronchitis the symptoms are much more intense than in the ordinary form of the disease. The dypsnea is greater, the fever is higher, and there is a greater degree of restlessness and anxiety. The difficulty of breathing, in these cases, arises from two sources: one, the swelling of the membrane lining the bronchioles; the other, the secretion. The latter may be small in amount, in which case the dypsnea will be but moderate; but when there exists an extensive implication of the bronchi, it increases to a severe degree, and suffocative attacks with cyanosis ensue; the victims are unable to breathe unless they are raised; the nostrils dilate, and the alæ nasi work spasmodically, as they do in bronchopneumonia. The cough is violent and distressing, but not so painful as in pleurisy or pleuro-pneumonia. It may occur in paroxysms, or be more or less continuous. The rapidity of respiration is greatly increased, sometimes reaching as many as sixty, eighty, or even more per minute. In this connection Dr. Martin Deschere makes the point that, "In young subjects especially, forty to fifty respirations per minute may be observed without necessarily denoting great danger. But if a rise to sixty or eighty and more respirations takes place, it is a sure sign that the finer tubes have become involved."

The quicker the respiratory movements, the shorter and more superficial will they be. At the same time, inspiration becomes more labored, all the auxiliary muscles are brought into play, and the presence of a moan with each expiration is pathognomonic of grave respiratory affection. Percussion even now will be normal, but auscultation will give rattling noises of all kinds and qualities, as the large tubes participate.

The relation of respiration to pulse is of great importance. It may change from the normal ratio of one respiration to three or four beats of the heart, to one respiration to two beats or less, according to the severity of the attack. As long as this relation does not exceed one to two (with a pulse of 140-150 in children under two years), we need not be alarmed; but if it becomes closer than one to two, there will be danger of

collapse; and if respiration reaches 100, with a pulse of two hundred or more, paralysis of the heart may set in from overstrain, though here the ratio is but one to two.

Henoch is accredited with a diagnostic point which is worth remembering. He says, "Children who are able to nurse uninterruptedly, without stopping to take breath, have either acute coryza or capillary bronchitis." He values this symptom of uninterrupted nursing so highly, that he advises always having the child put to the breast in the presence of the physician while making his examination, to enable him to judge of its manner of nursing.

Deschere advises that "Children from one to three years of age should be examined while in an upright position (sitting on the mother's or nurse's lap). Here a little kindness and tact will generally succeed, except in 'crude-antimony' children, who do not want to be touched. But this very peculiarity is an excellent indication for the drug, under the influence of which our patient is safe until the next visit, when he will be found of a more amiable disposition."

"The cough, although a most prominent symptom, is not a reliable guide to the severity of the affection. There may be extensive inflammation of the bronchi or the bronchioles, as evidenced by the pulse, temperature, respiration and physical signs, and yet the cough be suppressed. Again, during convalescence, there may be a continuous and most harassing cough, exhausting to the child, while at the same time, all the other symptoms may be most favorable. The temperature in capillary bronchitis will not rise above 103° Fahr., unless the air cells are themselves involved, constituting the disease one of broncho-pneumonia; but we cannot positively deny, in a given case, the presence of pneumonia, although the temperature may be below 104°. All observers agree on the unsatisfactory results of percussion in this form of pneumonia, and if we consider the gradual and dispersed manner in which the inflammation spreads into the air cells, affecting only small points at one time, these results are easily understood" (Deschere in *Hahnemannian Monthly*, Sept., 1882). Among the other and general symptoms which are to be noticed in this connection, is epigastric pain. It is not of great significance, for sick children are proverbial for having aches and pains, which they rarely locate at the seat of disease, or even that of real distress. Owing to the age of the child when capillary bronchitis is most common, it is not always possible to obtain the sputa. It is in most instances swallowed into the stomach, where it undergoes change before it is vomited up. It is sometimes possible, however, during a fit of coughing, to throw the child forward, and

thus secure enough for examination upon a cloth. At first the secretion is tough and tenacious; afterwards it becomes mucopurulent and thinner. It is usually yellowish-white in appearance, and often looks like foam, mixed with thin threads, from the minute bronchioles of which they are casts.

The temperature in this affection, as has been already observed, is higher than in the ordinary form of bronchitis, but not so high as in pneumonia. By careful observation it is often possible to note the transition from most extensive capillary bronchitis to broncho-pneumonia. The increased temperature which accompanies such a transition is very obvious. A comparatively circumscribed pneumonitis will give rise to a rapid elevation of temperature much more quickly than even a diffuse bronchial catarrh, even though implicating the finer tubes. Gastric disturbances are common. There is complete loss of appetite, coated tongue, and sometimes vomiting of mucus. The bowels are apt to be constipated at first, while later diarrhea, excited by the swallowing of so much mucus, is the rule. In the severer grades, defective aëration of the blood is observed, the respiratory process is insufficient, and gradual suffocation ensues. The blood is charged with carbonic-acid gas, and its oxygen is correspondingly deficient; the cyanosis deepens, the face is turbid, bloated, dusky, or livid. The lips, tip of the nose, malar protuberances, tongue and ears are very livid, and in marked contrast with the pallor of the surrounding skin. The veins of the head and neck swell. The fingers and toes, especially the nails, show also the cyanosis; the feet and hands may become edematous. The temperature falls, clammy sweats break out, particularly about the face, and then involve the whole body. The patient is exhausted, the head drops about in any direction. The pulse is very rapid, weak, small, compressible, and often irregular. The patient is restless; there is an anxious expression of countenance, which continues until the mind begins to wander, and the patient grows dull and apathetic, falling into a drowsy state; then a stupor, and finally a complete coma ensues, which precedes death. In some children there may be convulsions. The cough is not severe, and no attempt is made at expectorating; the breathing is very rapid, and gradually grows more shallow. Bronchial râles are plainly audible, and as the large tubes become filled, there is distinct crackling. Death occurs either from blocking up the large bronchi suddenly, or from extensive pulmonary collapse, congestion giving rise to edema, or from lobular or lobar pneumonia.

Diagnosis.—From what has already been said, the diagnosis of capillary bronchitis can only be obscured when it verges on

that diaphanous or hypothetical line which divides it from broncho-pneumonia. The distinction is not important.

The difference is merely one of degree. In capillary bronchitis, the râles are usually more diffuse and of larger size, while in lobular pneumonia they are limited to the affected space, usually at the bases of the lungs, where they are irregularly scattered. In lobular pneumonia we have more frequent respirations and less dyspnea, and less tendency to cyanosis. The temperature in pneumonia is higher, and dullness on percussion is more marked.

The duration of capillary bronchitis is usually four or five days, but may be longer. The fatal cases occur usually about the sixth to the eighth day. The symptoms which indicate a fatal termination are great lividity of countenance, cyanosis, coldness of extremities, dullness of comprehension, coma and convulsions. Favorable signs are lowering of temperature, greater ease in breathing, ability to nurse, desire for food, better color of countenance, increased strength.

Prognosis.—Capillary bronchitis is always a grave disease, but under appropriate treatment, even those cases which seem to be the most desperate oftentimes recover.

To the unwary the disease is full of surprises, and every case demands the closest attention of both physician and attendants. To the weakling, the affection is one full of hazard, and to the robust is not without danger. The prognosis should, therefore, be guarded but hopeful.

Treatment.—An even and equable temperature should be maintained in the room of the patient — 70° or 72° Fahr. is about right. Moisture of air favors expectoration and diminishes the cough. Inhalations of steam are, therefore, beneficial. A jacket of cotton-wool may be made to lightly envelope the chest, or still better, a jacket-poultice of linseed meal may be used, and kept warm and moist by an outer envelop of oil silk. If poultices are used, they should be renewed as soon as cool, for they are only of use when moist and warm. When taken off, they should be replaced with cotton-wool, or absorbent cotton.

The main dependence in the conduct of a case of capillary bronchitis, however, must be in the homeopathic remedy, and the indications for certain drugs have been so admirably given in a paper read before the American Pedological Association by Dr. Deschere, some years ago, that we are impelled to make use of them here, for the benefit of our readers.

In doing so we desire to express our obligations to the author for the liberty taken:

"The keynotes for the selection of the homeopathic remedy must be looked for in the character of the cough, the manner

of breathing, its character and frequency, the mental condition and the sleep.

"After that we must take into consideration the general appearance, as to constitution, and grade of prostration, the extent of the affection, manifestation of fever, pulse, temperature, appetite, thirst, stool, urine, etc.

"The first line of symptoms will give the most characteristic indications, as they contain the individual peculiarities; while the latter ones are of more general value, and will only confirm or rarely modify our choice of the remedy. Still, they must all be weighed according to their prominence and mutual relation.

"To begin at the beginning, I must say that two grave mistakes are frequently made with *aconite*, the remedy par excellence 'when the fever runs high.'

"The second mistake is to change acon. for another remedy when the fever decreases and the cough becomes loose.

"So long as acon. produces such a favorable change, why not continue it, as we would any other drug under the same circumstances? But if our patient has received enough of it, and is improving, then stop all medication, and, if necessary, give *sac. lac.*

"The indications for acon. should be more precise than those furnished by high fever, dry cough, and great restlessness, which it shares with other remedies. There should be present a short, dry, hacking, or sometimes ringing cough, worse after drinking cold water, and lying on either side, while lying on the back partially relieves it. The child may grasp its throat every time it coughs. The breath is hot, while the mode of breathing has nothing characteristic; it may be labored and anxious, or quick and superficial, or deep, slow and sighing.

"The character of the pulse is very important for acon. In inflammations it is hard, full, and strong. Restless sleeplessness, continual tossing about, with eyes closed.

"The quantity of the urine is greatly diminished even to retention. The urine is hot, dark-red, brown and turbid. The child is restless before urinating, and frequently cries during the act.

"The restlessness of *chamomilla* is much more of a nervous, passionate character; the movements are rather of a spasmodic nature. The child works itself into a passion, at the height of which it will be seized with a long-lasting, exhausting cough. The cough will also be dry (as in acon.), but only so about midnight, being looser in the daytime. With the cough, we notice a rattling of mucus in the trachea. The pulse is much smaller and weaker than in acon.; frequently unequal, changing from weak to tense and accelerated. The urine is also scanty and

painful, but rather yellow, and its turbidity is of a clay color. Cham. is of great value in the bronchitis of teething children.

"Another remedy, which I should never like to be without in the treatment of this affection, is *cina*.

"It is, so to say, of a higher pitch than cham., and simulates more threatening conditions. The child is uncontrollable, but deathly pale constantly, whether quiet, coughing, or crying. It screams when approached or touched. The breathing is short, at times interrupted, imitating Cheyne-Stokes respiration. The cough is like that of acon., dry, short, hacking, especially at night, sometimes gagging, and the child may seem to swallow something immediately after coughing. Unlike the two remedies above-mentioned, the urine is copious, and passed frequently. As soon as the child falls asleep, it starts, screams, and kicks. Convulsions may be apprehended at any moment.

"In such apparently alarming conditions, a few doses, even a single dose, of cina, 30th or 200th, will change the scream to a quiet repose. The physical signs may point to *phosphor.* or *tartarus emeticus*, but when the above nervous symptoms are present, cina will have to pave the way for their use. Such conditions are not unfrequent in nervous children, even when free from the intestinal irritation of worms.

"The most suitable remedies in bronchitis are undoubtedly phosphorus and *antimonium tartaricum*. The indications for both are too well known to need repetition here. Still, in regard to phos., I should like to call attention to a peculiarity diametrically opposite to *lachesis*. 'The cough and condition of the patient are always better after sleep.' This is especially valuable when the disease has become chronic, and a barky, croupy cough remains.

"Phos. is indispensable in the true capillary form, mixed with broncho-pneumonia. The pulse and temperature run high. The pulse is full and hard, as in aconite, but the time for this latter remedy has passed. Also in cases where prostration is marked, and the pulse becomes small, weak and frequent, phos. is highly valuable. It must then be repeated according to the intensity of the symptoms, every *five to thirty* minutes, extending the interval when improvement sets in.

"About ant. tart., I have frequently heard the remark, that it is indicated only when fair râles (in the smaller tubes) are predominant, while *ipecac* is said to correspond to the coarse rattling (in the larger ones). Hering has it so in his *Condensed Materia Medica*, while in his *Guiding Symptoms* he heavily marks under ant. tart., 'Such rattling that it threatens to suffocate the child. Respiration, with great rattling of mucus.' Again, we should remember the characteristic symptom, 'When

the child coughs, there appears to be a large collection of mucus in the bronchial tubes,' and if we listen to the chest, we hear the snoring, coarse, rattling breathing all over that region.

"The above symptoms all indicate ant. tart., and the physical signs in addition, will prove that this remedy is well suited in cases where the chest is filled with mucus to the top of the throat, and consequently coarse râles prevail.

"Considering the excessive exhaustion produced by ant. tart., we readily understand that it is of high value in impending paralysis of the lungs, characteristic of capillary bronchitis mixed with broncho-pneumonia.

"Drowsiness, face deathly pale, bloated or livid, eyes sunken, with blue margins; abdominal, panting respiration; unequal, intermittent breathing during sleep, — all these symptoms strongly call for ant. tart.

"The *ant. sulph. aur.*, lately advocated again by old-school physicians, has been obsolete with them for many years. Do not ask them 'Why?'

"Though its proving is yet meager, it acts most charmingly in scrofulous children attacked with acute or chronic bronchitis, with profuse accumulation of mucus; especially when they are taciturn, obstinate, fretful, and peevish. The appetite is entirely lost, breath foul, tongue thickly coated. Perhaps the two atoms of sulphur, which it contains, more than the ant. crud., give it a deeper action on the system generally, where the latter drug seems to be indicated, but fails.

"*Ipecacuanha* is differentiated from ant. tart. as follows: First of all, the bronchial râles are finer throughout, and if coarse, they are not so constant and prominent, as in tart. emet., but appear rather with deeper inhalations. The cough of ipec. is more spasmodic, and the tendency to vomit is greater with this drug. In antimony the tendency to pulmonary paralysis, general exhaustion, and collapse is greater, while in ipec., the spasmodic character prevails with the prostration.

"Many other remedies have been successfully used by different physicians on special indications, as *hepar*, when the cough is croupy, but when, as Prof. T. F. Allen appropriately describes it, 'the sharp edge of the cough is broken off.' It is rather a choking, phlegmy cough. It is frequently called for after the exhibition of ant. tart.

"The keynote for *lycopodium*, 'the fanlike motion of the alæ nasi,' is not a simple rising and falling of these parts, as *belladonna* and some others have it, and which has disappointed many; but the nose is widely dilated, like the end of a trumpet, and then forcibly contracted.

"*Arsenicum* is another remedy of high value in capillary

bronchitis. Excessive anxiety, as expressed in the face, which is earthy gray, sunken, or edematous; the child cannot find rest anywhere, changes continually from bed to lap and *vice versâ;* burning heat, with great thirst for small quantities of cold water; these are the well-know characteristics which call for arsen. and seldom in vain.

"With *dulcamara*, *chelidonium*, *bryonia*, *gelsemium*, *eupatorium*, *rumex*, and *veratrum viride* I have had little experience.

"In conclusion, let me say that there should not be any more difficulty in the treatment of capillary bronchitis than of any other diseased condition; that we should not be misled by supposed pathological conditions, nor that we should give preference to any drug recommended in the books for such conditions. We must be guided strictly and only by the facts presented to our trained senses and reason, and select carefully from the wealth of our materia medica, that drug which alone will answer our purpose, though it may never have been thought of in that connection before. Let the homeopathic physician ever remember 'The more haste the less speed.'"

CHAPTER IX.

ASTHMA.

Definition.—Asthma consists of irregular or periodic attacks of paroxysmal dyspnea, with intervals between of entirely or comparatively free and unembarrassed respiration.

The infrequency of asthma among infants and children in this country is doubtless the reason that nearly all American text-books on diseases of children take no notice of it. Day is about the only English author who more than mentions it. Goodhart ignores it entirely. West devotes less than a page to it, while Underwood, Churchill, Steiner and Niemeyer do not even allude to it as a disease occurring in childhood. It is surprising, therefore, to read the statement of Hyde Salter that "more cases originate during the first decade than during any other period of life." He further states that out of 225 cases (all ages), 71 dated back to the first ten years of life, and in 11 of the number, it came on under the age of one year. West confirms these observations and cites Löchner, of Prague, and Dr. Politzer, as having also frequently met with it in early life. According to our own experience, it must be very rare, for we have never met with more than half a dozen cases, either at the Half Orphan Asylum, at the Dispensary, or in private practice.

It is not a disease likely to be often encountered in dispensary practice, for, according to all authorities who make mention of it, it is more common in the upper than in the lower classes, for reasons which will appear later on.

Etiology.—The causes which are supposed to enter into the production of asthma are divided into *predisposing* and *exciting*. The predisposing causes are largely hereditary. In rather more that two-fifths of all Salter's cases he found distinct traces of inheritance, direct or lateral, near or remote. He also found the disease much more prevalent among boys than girls—the proportion in sixty-three cases being forty-six to seventeen. No satisfactory solution of this difference is given. Theoretically the figures ought to be reversed, for asthma is generally regarded as one of the many and various manifestations of what is called the neurotic temperament, or constitution, which reaches a higher development in females than males. Among

the exciting causes are those which act directly on the lungs, such as bronchitis, either primary or secondary; whooping cough and pneumonia; the presence of emphysema in the lungs, and especially that collapsed condition of certain portions of the lungs known as atelectasis, occurring from rachitic deformity, or from broncho-pneumonia. Enlargement of the bronchial glands is also mentioned as a cause of asthma from pressure upon the pneumogastrics. Other exciting causes are reflex in their nature. Among these are nasal polypi and irritation of the gastric nerves by worms or indigestible food—peptic asthma. Another form of the disease is known as herpetic asthma, which arises from certain affections of the skin, notably eczema and urticaria.

West says: "I have never known eczema to be very extensive and very long continued without a marked liability to asthma being associated with it. It cannot be said, however, that the two conditions always alternate, the asthma being worse when the cutaneous affection is better; but the radical cure of the eczema is usually followed, though often not till after the lapse of three or four years, by the cessation of the liability to asthma. Uremic, gouty and saturnine subjects are quite liable to asthma. Trousseau tells of a boy of five whom he saw in well-characterized fits of asthma, and who, two years later, had typical gouty arthritis, during the continuance of which he was free from his asthma.

Salter tells of an adult who could produce an attack at will by applying cold to the instep.

Dr. Leila G. Bedell has reported a number of cases of well-marked asthma which she considers entirely idiopathic, that is to say, unconnected with any other disease, as measles, whooping cough, or bronchitis; but in all of them the neurotic feature was well marked. One of them was only affected with an attack "when sitting from daylight through twilight into *darkness*." The attacks always occurred immediately after dark and were preceded by continued gaping. Another case was always preceded by continued sneezing, as if an acute coryza were about to set in; while still another has attacks following a severe spell of crying. Dr. Bedell's cases were all girls, her experience being contrary to that of Salter and others in this respect. In four of her five cases the asthmatic tendency seemed to have descended from the *grandmother* on the *father's side*, and in the fifth case from the *grandfather* on the *mother's side*—the intervening generation in each case having shown no tendency whatever to asthma.

In all of the cases one type prevailed, *viz.*, a sensitive, delicate, nervous organization. After discussing these cases at

length, Dr. Bedell says: "Hence, from my standpoint (regarding the sympathetic system the seat of the emotions rather than the brain), I should regard asthma as preëminently a neurosis, having its origin in the sympathetic; and conclude that the only relation which the pneumogastric sustains to the disease, obtains wholly from its intimate connection with the sympathetic through the fibers arising from the sympathetic ganglia on the root and on the trunk of that nerve. In the treatment of such cases the list of remedies which I have found successful narrows itself down to three—namely, *gelsemium* 30x, *sambucus* 6x, and *ipecac* 3x.

"In the case of the child whose attacks were always preceded by crying spells, gels. 30x, was the *only* remedy which ever gave relief."

In many cases of asthma, when the habit is once established, the exciting cause is too trifling in many instances to be recognized. The attacks occur at all seasons of the year, though more frequently in spring and autumn, when colds are most prevalent. If the attacks are not exceptionally severe and frequent, there is a strong probability of their ceasing about or before puberty. In two of our own cases, that resisted all remedies that were brought to bear upon them, the attacks ceased spontaneously, one at the age of eleven, the other at twelve.

Pathology.—All that is known relative to the pathology of asthma is summed up in these words of Berkart, "Asthma, therefore, is only one link in a chain of quasi-independent affections, which commences with inflammatory changes of the pulmonary tissue, and terminates with emphysema or bronchiectasis."

The symptoms of asthma in children do not differ from those of the adult. The attack, as a rule, comes on suddenly. The face is pale, cyanotic and anxious. The skin is moist and cool. There is no fever. The pulse is rapid and often irregular. The respiration is slow and labored, expiration being much prolonged; the chest is fixed in the position of full inspiration, with a low diaphragm; percussion-resonance is increased in intensity and area; on auscultation the respiratory murmur is much enfeebled or absent, and sibilant and sonorous râles are heard everywhere. The cough, if present, is short and dry. If the child is old enough to expectorate, the paroxysm is generally terminated by the expulsion of a small quantity of tough, viscid mucus. The attacks usually end as they came, the child falling asleep, and awaking next morning as well as usual. The frequency of repetition is very variable and irregular.

The prognosis, as above indicated, is usually good.

Treatment.—Besides the remedies mentioned by Dr. Bedell,

and which are the ones we have ourselves used with the most success, there are others which may prove useful in cases where these have failed, or where the indications point to them, *viz.*, *cuprum*, *veratrum*, *aurum brom.*, *staphysagria*, *arsenicum*, *bryonia*, and *hyoscyamus*.

EMPHYSEMA.

The term emphysema is used to denote an excess of air in the lungs—either in the distended cells of the lungs, constituting *vesicular* emphysema; or into the intercellular spaces, constituting *interstitial* emphysema.

Vesicular emphysema is that form in which the air is still contained within the air vesicles, and is by far the most frequently met with. Only a few of the air sacs may be involved, the whole of a lobe, or even, in extreme cases, the entire lung. The apices and margins of the base of the lungs are particularly liable to be affected. In emphysema the lungs are increased in size, while their elasticity is destroyed. It is not a disease peculiar to childhood, but may occur at any age. As it is often encountered in early life, it requires a brief description. It is especially frequent in children who are the subjects of rickets and asthma. In some cases, however, it appears to be congenital. In vesicular emphysema the morbid anatomy shows only enlarged air vesicles, with here and there one which has been distended beyond the point of rupture, so that two or more sacs are thrown together. This, however, is a rare accident. More frequently the walls of the air cells are simply distended, their elasticity destroyed, and they resemble a small, inanimate bladder more or less inflated with air. Atelectasis is a term denoting collapse of the air cells, with the cell walls in apposition; emphysema is its direct opposite. Sometimes the bronchioles or medium-sized bronchial tubes are distended, and lose their resiliency, which condition is known as *bronchiectasis*. This is so rare a condition as to deserve nothing more than its bare mention here, and the statement that it has been known to occur as a result of whooping cough, bronchitis or pneumonia.

In *interstitial emphysema* (sometimes called *interlobular*), the connective tissue which binds the lobules together is infiltrated with air, which has escaped from the ruptured vesicles, and sometimes this is sufficient to raise the pleura from the surface of the lung. There are no real tissue changes in emphysema, other than those implied in the foregoing description. There is no inflammation, no degeneration of tissue, no catarrh other than that which may belong to the bronchitis or the whooping cough which preceded the dilatation. The cause of the trouble

may be indirectly traceable to inopportune closure of the glottis. In pertussis the explosive nature of the cough produces a greatly increased pressure on the delicate walls of the vesicles, and this is added to, if, at the moment of cough, the glottis is closed, as it is liable to be, in efforts at suppression. The result is felt in the air cells, which feel the pound of the cough, and are unable to resist its force.

If the opening through which air has escaped is small or soon closed, the misplaced air is readily absorbed, and but little damage is done; but if air continues to pass out, it may find its way between the lung and the pleura along the trachea, or sheath of the vessels, and distend the subcutaneous cellular tissue. The rupture of air cells may be due to external injury or violence; or to forced respiration into the air passages of an asphyxiated infant.

It is more common in bronchitis and whooping cough than in pneumonia or phthisis. The disease is said to produce hypertrophy of the right heart and cerebral congestion.

Symptoms.—The chief symptoms are shortness and difficulty of breathing. This is increased by any physical exertion, such as walking fast or ascending stairs. At first this is only felt when some unusual exertion is made, but as the disease advances, the breathing becomes permanently accelerated and even panting when the patient is sitting still. In mild cases, even a true emphysema of short duration may present no recognizable symptoms during life. Children suffering from emphysema, do not, as a rule, suffer the same amount of distress in consequence, that adults do. The sputum is sometimes tinged with blood, from ruptured capillaries in the over-distended air cells. The face is apt to be dusky, and in long-standing cases, cyanotic. The nostrils are dilated, the voice is weak, and the cough feeble. The finger tips are cold and blue. Headache and drowsiness are usually experienced. The abdomen is distended and as a result of the disease, the liver and spleen become increased in size. Emaciation is frequently noticed.

In cases attended with dropsy, tricuspid regurgitation is present. The entire thorax is misshapen, the upper part being enlarged, giving it a barrel shape. The ribs lose their obliquity, and their anterior extremities are drawn upwards.

The respiration is peculiar and characteristic. The upper part of the chest is nearly fixed, and the diaphragm appears passive. The inspiration is short and hurried, from the diminished expansion of the chest, and the expiration is wheezy and prolonged. Spasmodic fits of coughing are common, especially if the bronchial tubes are loaded with mucus. In conversation, the child waits to get breath; if its answers are required quickly,

it stops frequently in the midst of a sentence to get fresh breath. When emphysema is complicated with organic disease of the heart, or with confirmed asthma, the prognosis is bad. The disease is probably irremediable. But when it occurs as the accompaniment of whooping cough, it will gradually pass away with the disorder, and the child may grow up without any sign of ever having suffered from it.

This observation of Day's we have repeatedly confirmed. Auscultation and percussion yield no satisfactory results in this disease.

Treatment.—From what has been said relative to the cause and nature of this affection, but little good is to be expected from drugs administered with reference to direct results. But great good may be anticipated from indirect treatment, by which we mean, treatment addressed to the causes which have been active in the production of the diseased condition.

The patient here, as everywhere, needs the medicine and not the disease. The cough must be controlled—hence remedies addressed to the cough, are of first moment. Then remedies should be addressed to the general cachexia. The appetite should be improved; the general health improved; perhaps a change of air may be advisable; pulmonary gymnastics and massage of the chest are advised. Every precaution should be taken to prevent an access of fresh colds, and an aggravation of the cough already present.

CHAPTER X.

ATELECTASIS (COLLAPSE OF LUNG; FETAL CONDITION OF LUNG).

TWO forms of atelectasis are recognized, namely, *congenital* and *acquired*. In the former variety some portion of the lung, more or less, remains unexpanded after birth, and in these portions the fetal condition is maintained for hours, or in some cases, for weeks and months. In the acquired variety, owing to some obstruction to the respiratory act, certain portions of lung—sometimes an entire lobe—collapse, and being impervious to air, the same fetal condition, as in the former case, is present. The congenital variety is usually to be regarded as one of the accidents of birth. In some cases it is due to protracted labor, to breech presentation, to prolapse of the cord, etc. In cases in which no respiratory act has taken place, of course the whole of both lungs remains airless, and there is general atelectasis. In the acquired form, the extent of collapse varies from a small area to an entire lobe, or lobes. Various causes operate to bring about this condition. It is a very common one in infants prematurely born, and is due in such cases to the inherent weakness of the child; it lacks the strength to take a vigorous inspiration, and the lungs consequently remain unexpanded. Later on, still owing to an excessively feeble state of the organism, the air is gradually expelled from the air cells, but there is not strength enough to refill them, and collapse of the cell takes place. Again, an infant affected with rickets, in whom the bones are soft and yielding to atmospheric pressure, acquires atelectasis from compression of the lungs. Whooping cough, bronchitis and broncho-pneumonia are very often forerunners of this disease, and it frequently comes on suddenly and without warning.

The acquired variety of atelectasis is not confined to infancy, but is common to all ages. It is most frequently met with, however, at the two extremes of life—infancy and old age.

It is stated that the portions of lung most apt to be affected by pulmonary collapse are the interior margins of the lungs, the edges of the lower lobes, and the middle lobe of the right lung. In any event, whether the morbid condition is congenital

or acquired, the results are the same. The affected portion of lung is unexpanded, collapsed, airless.

Etiology.—In addition to the causes already noted for imperfect or non-expansion of the lungs at birth, there are various others mentioned by authorities, such as imperfect development of the respiratory nerve centers of the fetus, which then do not respond to the want of oxygen, and no respiratory act is attempted. In such cases the child is "still-born." In some cases, as in premature detachment of the placenta, or placenta previa, there is a sudden interruption to the supply of oxygen from the maternal blood, which excites violent efforts on the part of the child, which only result in inhaling blood, mucus, meconium or liquor amnii, which, being drawn into the larynx or trachea, produce suffocation and pulmonary collapse.

A very common cause of acquired atelectasis in infants is a firm plug of mucus acting as a ball-valve, preventing air from entering the air vesicle, while it does not prevent the contained air from escaping. In other cases the bronchiole leading to the alveoli is occluded by swelling or mucus, and eventually the air contained in the vesicle is absorbed and the cell collapses. West has pointed out the fact that collapse of the lung may occur independently of any affection of the air passages. He cites an instance of this kind in which the patient, a little girl five months old, died greatly exhausted from diarrhea. There was extensive atelectasis of the right lung, but the bronchia were pale, and contained no secretions.

Collapsed portions of lung occupy less space than normal lung tissue, and sink below the general level of lung surface. As the collapsed areas are generally small in size, it gives the affected lung an irregular outline. An atelectalic lung is of leaden hue, and when cut, a clear or bloody fluid exudes. It is firm to the touch, or perhaps somewhat sodden in consistence, like liver or spleen. From its resemblance to ordinary flesh, it is said to be in a condition of carnification.

Symptoms.—When imperfect expansion of the lung exists from birth, the physician in attendance, upon that event, need have no difficulty in the recognition of the trouble. The heart-beat is feeble and irregular, the cry is faint or almost inaudible, there are no voluntary movements of the limbs, the respiratory efforts are made only at long intervals, and then are weak and desultory gasps; the color of the child, instead of being dusky red, is pale, leaden or cyanotic. If an occasional feeble effort to breathe is made, it is accompanied with a moist, rattling sound. The infant shows great weakness; the limbs hang limp and motionless; the eyes are closed and the pupils dull. The

lips have a bluish tint. The majority of children born in this condition quickly die, although they may live on for hours or days. Under favorable circumstances, the respiratory efforts become more effective, and are closer together. Finally, a powerful inspiration is effected, the face loses its leaden hue, and takes on a red or natural pink color, the child utters a loud cry, and the pulsation of the heart becomes normal in rhythm and volume.

In acquired atelectasis, the symptoms are similar, but less pronounced. It occurs most often in the early period of life, and in delicate subjects, who are suffering from whooping cough, bronchitis, or some wasting disease, like diarrhea. The symptoms are referable to the respiratory function, and are mild or severe, according to the amount of lung tissue involved. The breathing is hurried and shallow—the inspiration being slower and more difficult than the expiration. The pulse is quickened and its volume is diminished in direct proportion to the amount of consolidation. The color of the skin is darkened, sometimes to the extent of lividity. The elastic chest walls, over the portion of affected lung, yield to atmospheric pressure, and are sunken as compared to the condition over other portions of the chest, where the lungs are doing compensatory work, and here there may be bulging of intercostal spaces from over-inflation of the uncollapsed vesicles. Emphysema, however, is not usually associated with atelectasis.

In well-marked cases there are evidences of more or less consolidation or solidification of the lungs, which for a long time led this condition to be confounded with pneumonia.

The dullness on percussion is usually slight, unless there be associated with the collapse an abundant pleuritic effusion or pneumothorax. There is no inflammatory condition attached to atelectasis pure and simple, consequently there is no increase of bodily temperature, except as it is associated with other febrile maladies. The general state is one of prostration and great depression, and after a period varying from days to weeks or months, the child generally dies from exhaustion.

Treatment.—In congenital atelectasis every effort should be made to effect a full inflation of the lungs.

This should be attempted by means of artificially forcing air into the lungs; by using the Marshall Hall method of resuscitation; massage of the chest, and by alternately sousing the child into hot and cold water. A draught of cold air should be allowed to strike the bare cutaneous surface, which tends to arouse the dormant respiratory nerve. In some cases, where there has been no special delay in the labor, simply blowing in the child's face, or slapping the buttocks with a towel wet in

cold water, is sufficient to excite a deep inspiration and bring forth a satisfactory cry.

Dr. Busy succeeded in restoring life in cases of this kind in two instances after all other means had been tried, by what is known as the Silvester method of resuscitation in drowning cases. This method consists in laying the child upon its back, while both arms are slowly and simultaneously raised towards and alongside the head, and then replaced and pressed against the sides of the chest to expel the air from the lungs. Dr. Francis Minot, in Keating's Cyclopedia, thus describes a method suggested by Schultz, and which he indorses as having proven efficient in his hands: "The child being laid on its back, with its head toward the operator, is grasped by the hands applied to its chest and shoulders in such a way that the head falls backward, the face towards the knees of the operator, while the belly and legs hang down in front. The weight of the head in one direction and of the rest of the body in the other, causes an enlargement of the chest by traction, with depression of the diaphragm, and promotes inspiration. The operator then swings the child quickly upward, reversing its position so that the head is flexed upon the chest, while the trunk and legs fall downward and towards the face, thus compressing the chest and expelling the air."

Faradization has been used successfully in some cases, but in our own hands it has, for some reason, always failed. It should be applied with care, if at all, and only sufficient strength of current to incite respiratory effort. In acquired atelectasis, the main indications are to overcome the debility and exhaustion which are always present, and also the diseased condition that has preceded the pulmonary collapse. Change of air, removal of the patient to some elevated region, where free ventilation and stimulating atmosphere can be had; good, nourishing food, and the judicious use of stimulants will often prove beneficial.

Deep breathing and vocal gymnastics are useful; the patient should be encouraged from time to time to take a deep and forcible breath, with a view of expanding the collapsed portions of the lungs. Sponging the body with cool or cold water is useful, accompanied with brisk friction with the hands over the entire body. The internal treatment by means of drugs, is of little use, except in the acquired variety. Here the remedies most applicable will be those already mentioned under the head of capillary bronchitis and those suggested in connection with broncho-pneumonia. Dr. Ludlam relates a case presenting sudden and alarming symptoms of collapse of the air cells, following an attack of bronchitis, in a boy ten days old. After

trying other remedies with little or no effect, a grain of tartar emetic 2x trit. was put in a third of a glass of water, and doses of it given at short intervals. The result was almost instantaneous relief, and the child recovered. Dr. L. expresses the belief that *antimonium tartaricum* is practically and pathologically specific for post-natal collapse of the air cells. *Nitro-glycerin* 3x, in weak solution, should be a valuable remedy in this condition, from its powerful stimulating properties.

When the collapsed state is consequent on pressure from distension of the pleural cavity, the pleuritic affection itself must be attended to before any expectations or hope need be entertained of compressed pulmonary tissue resuming its normal condition and function.

CHAPTER XI.

PULMONARY PHTHISIS.

PHTHISIS may be defined to be that form of tuberculosis which principally affects the pulmonary tissues. It is also frequently referred to as acute pulmonary consumption. In our chapter on Tuberculosis, we endeavored to draw a distinction between general tuberculosis, in which caseous nodules were found widely disseminated throughout the glandular structures, and that form of the same pathological process, which is manifested when the lungs are assailed. It is no longer necessary to discuss the question whether tuberculosis and phthisis are identical. Their identity is now almost universally admitted. When tuberculosis affects the lungs, however, we have a different train of symptoms; the disease runs a shorter and somewhat different course, and the practice is a proper one to give it special consideration. As regards the age among children when pulmonary phthisis is most apt to show itself, there is much diversity of opinion. According to Portal, it may be congenital. Trousseau observed it quite often in the first years of life, while Papavoine asserts that it is frequent only between four and five years of age. James Clark found it frequently after the second year, while others deem its occurrence before the age of five or six as rare.

According to Baginsky, eight per cent. of all cases of pulmonary tuberculosis are met with prior to the tenth year.

About all that need be said under the head of etiology of phthisis has been said when speaking of acute tuberculosis.

It is by no means certain that the disease is transmitted directly from parent to child. It is more probable that heredity begins and ends with "the propagation of a peculiar debility or inefficiency of either the whole organism, or special organs, which deprives the individual of its power to resist injurious influences or deleterious invasions." There is unquestionably an inherited predisposition to pulmonary disease, which is sometimes very early noticeable, but in more cases is only manifested as the child approaches maturity. Then we observe "the relatively great height of the body as compared with its weight, the thin bones and muscles, transparent and delicate skin, scanty subcutaneous tissue, the extensive nets of superficial veins, the

flushed or pale cheek, pale mucous membranes, flat chest, with short sterno-vertebral diameter, large intercostal spaces, shortness of costal cartilage, either congenital or resulting from premature ossification, the marked depth of the supra- and intraclavicular fossæ, the prominent scapula, the clubbed finger ends, and the feeble heart."

The phthisical conformation in typical cases has been spoken of by nearly all authors, ancient and modern, and yet it is not always safe to predicate a diagnosis on mere appearances. We are apt to be frequently deceived. It would often puzzle a close observer to distinguish a rheumatic from a tuberculous subject. Two types are met with that are quite opposite, and yet both suggestive. One is the pretty and intelligent child, with well-formed but light skeleton, soft hair, long eyelashes, peach-like skin, good nails and teeth and long fingers. Then there is another type of coarser grain, the pale, sallow, stunted, thick-skinned and ill-favored child who goes the same way, but by a somewhat modified route. The shape of the chest is sometimes quite characteristic. Heilier describes three typical forms: (1) the long, circular chest; (2) the long chest with narrow antero-posterior diameter; (3) the long, pigeon-breasted chest.

In a general way the tubercular chest may be said to be small, with the apices contracted.

In children the apices of the lungs do not exhibit signs of the initial lesion in phthisis nearly so often as is the case with adults. The tuberculous infiltration is more disseminated through the pulmonary tissues, and disease foci are quite as apt to be found at the base of the lung, or in the lower lobes, as at the apices. This is accounted for by the fact that in children a bronchitis or a pneumonia, affecting by preference the lower parts of the respiratory field, is commonly the precursor of the tubercular disease. Then again, the lungs of phthisical children do not show those cavities that are so frequently found in adults. The disease runs a more acute course, and before cavitation of the lungs has advanced to any great extent, the disease has taken a change of venue to the meninges of the brain or to the mesenteric glands of the abdomen.

Symptoms.—Without discussing at length the varieties of pulmonary phthisis, it may be said that in many respects the symptoms do not materially vary in childhood from those observed in mature life. Still, there are some essential differences, which will be apparent as we proceed. In the early stages of the disease, the symptoms are often quite obscure. The cough may be short and hard, dry and hacking, or loose and easy. It is often so trifling as to be overlooked. The child is pale and

thin, with a capricious appetite. The bowels are irregular and suggestive of worms. These derangements are apt to receive little attention, being regarded as temporary and inconsequential.

If a number of careful examinations are made, however, it will be found that the evening temperature is raised, with a remission in the morning, which may be so intense that the temperature is normal or subnormal. The skin is flabby, waxy, yellowish or covered with pityriasis. In infants the voice is thin, and the cry is low or inaudible.

The languor, weakness and general debility are marked and progressive. The physical signs, especially in the early stages of the disease, are usually very ambiguous. The signs are subject to such variation, that only a frequent repetition of examinations will enable one to confirm a positive diagnosis. There is a lack of constancy in the symptoms, which is more marked when the disease begins at the root of the lungs, because for some time it will be covered by vesicular structure, which will obscure auscultation and percussion and confuse the data upon which alone precision can be based.

Perspiration, which is so constant a symptom in the adult, and which is so exhausting, is equally as frequent and intense in children. It usually begins about midnight, or soon after, and increases the tendency to emaciation. Respiration is more rapid than normal, and is superficial in character. The disease is well advanced, as a rule, before auscultation and percussion reveal any serious changes in the lungs. In some cases, there are one or more areas of dullness, but this is by no means pathognomonic, for such areas may come from more interstitial-inflammatory hyperplasia, or from collapse of small portions of lung. Slight cavernous breathing may be present from dilatation of a bronchus, as well as from a small phthisical cavity. When cavernous breathing arises thus from a dilated bronchus, it is more permanent than when produced by a small cavity, which may fill up with mucus or pus, in which case this characteristic sound may disappear. Hemorrhages from the lungs are rare in children, more rare, indeed, in phthisis than in whooping cough. In the latter affection some spitting of blood is not infrequent, and serious consequences may arise from blood coagulating in the finest bronchioles, causing local collapse of the lung, and broncho-pneumonia in consequence.

Complication.—Pleurisy, usually of fibrinous character and of localized extent, is a very common and painful complication. It may occur early in the disease, especially if bronchitis or broncho-pneumonia has preceded. In other cases it may not appear until the disease has made considerable progress.

In children in whom the disease is running a chronic course, we have the same complications as are witnessed in adults, *viz.:* lardaceous disease of the viscera, fatty liver, tabes mesenterica, and intestinal or laryngeal ulceration.

Death occurs in most cases in very young children, through the outbreak of a general or acute tuberculosis, and the extension of the disease to the brain and its membranes.

Prognosis.—It is doubtless true that pulmonary phthisis is in many cases susceptible of amelioration. It is also undoubtedly true that under favorable circumstances, and in cases where the disease has made but little progress, recovery is sometimes possible. Favorable cases are those in which heredity cuts but a small figure, or no figure at all, and where the disease is superinduced by a primary disease, such as whooping cough, pneumonia, bronchitis, or a limited condition of atelectasis. Some cases of pulmonary phthisis must recover, because *post-mortem* examination of the lungs of children and adults, dead of some other disease, often reveals the cicatrices of old inflammations and cavities of unmistakable tuberculous origin. It is no uncommon thing to find in necropsies chalky concretions, calcareous deposits, and old adhesions which mark the site of former specific disease, from which the patient has recovered. It may be accepted, therefore, as certain that tubercular disease is sometimes amenable to treatment.

At the same time, it must be remembered that cases may ameliorate for a time, and then suddenly develop meningitis or general tuberculosis, with fatal results.

It must be borne in mind, also, that if cases do not show any tendency to improvement, the course of the disease in children is habitually shorter than it is in adults.

Treatment.—The successful treatment of pulmonary phthisis must necessarily be largely hygienic and circuitous.

There are no drugs having the power to directly arrest the progress of tubercle. Good feeding and good air are primarily essential. And just here we are met oftentimes with unsurmountable obstacles. The appetite is capricious, or the stomach intolerant of such articles of food as the requirements demand. Vomiting is easily excited, and fats which are necessary to antagonize waste cannot be taken. A diet rich in fats is very desirable, if it can be borne. These children should be encouraged to eat plentifully of milk, cream and fresh eggs. Rare beef and mutton, or the expressed juice of either, is very rich in nutrition. Stimulants in small quantities are of unquestioned value. Every attention must be given to the general health; the tendency to diarrheas must be carefully guarded, and plenty of fresh air is an absolute necessity. The rooms in

which the child lives and sleeps should be well ventilated. If the mother is not perfectly healthy and a good nurser, a wet nurse should be secured, or in lieu of this, suitable artificial food should be substituted. One of the best foods for these cases is composed partly of proteinol, which is a compound of pure beef fat, eggs and sherry wine.

Cod-liver oil in some form has a well-earned reputation in the treatment of phthisis. There are preparations now in the market in which the taste of the oil is so disguised that the most sensitive palate can scarcely detect it. Combined with malt, or maltine, of which there are numerous brands, it will answer a good purpose if not too laxative.

There are cod-liver oil biscuits in which the taste of the oil is elegantly concealed; and almondized oil, and capsules, any of which is well calculated to overcome fastidiousness. But infants and young children do not usually object to the clear oil, if well refined and pure, and the nearer we get to the crude oil, other things being equal, the better.

But the crowded city or town is no place for a child afflicted with tuberculosis. A place in the country should be chosen where the air is dry and plenty of opportunity can be had for out-of-door living. The skin should be kept in an active and healthy condition by frequent sponge baths, combined with brisk frictions (massage). When gastric catarrh is present, it should receive immediate and persistent attention. It is thought by many that inhalations of turpentine, eucalyptol, menthol, tar, etc., are of benefit. We have never been able to satisfy ourselves of any permanent good from them, although they sometimes seem to produce temporary amelioration. Even this is something. Sometimes the cough may be allayed somewhat by simple means in addition to the homeopathic remedy. Thus, sipping from time to time a little glycerin and water, or glycerin, rock candy, and dilute whisky, gum-arabic water, Iceland-moss tea, flax-seed tea, made quite sweet with rock candy; or letting a little vaseline or cocoa butter dissolve in the mouth.

For night sweats, sponging the body over with vinegar and water, or what is more pleasant, acetic or sulphuric acid with cologne and water, at bed-time, for several nights in succession has often a happy effect. Small doses of *picrotoxin* 3x at bed-time, is strictly homeopathic. Sometimes with older children a tumblerful of milk or buttermilk works well.

Medicinal Treatment.—To give the indications for all the remedies which may be of use in this affection, in all of its stages and phases, is out of the question. The list of the leading ones is all that space will permit. For others, the reader is referred

to pages 512, 514, where an extensive repertory of cough remedies will be found, and also to the chapter on Pneumonia and Bronchitis.

Antimonium tart.—Cough short, shrill, loose, and rattling, aggravated at night and followed by nausea, vomiting and dyspnea; excessive restlessness; prostration; chest full of loud, rattling mucus.

Arsenicum.—Great emaciation, weakness and prostration; intense burning pains in stomach, with intense nausea and vomiting; excessive thirst, drinks often, but little at a time; breathing very difficult; diarrhea, stools dark and acid, excoriating anus and nates; burning, shooting stitches in lungs.

Belladonna.—Intense congestion of head, with violent, throbbing headache; face red and hot; carotids visibly throbbing; cough dry, violent, hollow and spasmodic, aggravated by cold, motion and at night; voice husky and very hoarse; larnyx painful, swollen, and inflamed; sweat on covered parts; cramp-like pain in upper part of chest.

Calcarea carb.—Cough dry, short and hacking, worse evenings and when lying down; expectoration of thick, yellowish, offensive mucus, sometimes tinged with blood. Especially useful in light-haired, plump children of a scrofulous diathesis; *calc. phos.* useful in same cases, *calc. iod.* in tubercular patients.

Drosera.—Violent paroxysms of cough following each other so rapidly that patient loses his breath; cough dry, hard and spasmodic, and followed by nausea and vomiting, aphonia; cough aggravated at night and when lying down; breathing rapid and oppressed; alternate diarrhea and constipation.

Ferrum met.—Rough, hoarse voice; dyspnea; small, weak rapid pulse; coughs up bloody mucus or pus in mornings; cough dry and rasping at night; epistaxis; great emaciation, weakness and prostration; voracious appetite, with extension of abdomen; stools sudden, watery and painless. Especially useful in tuberculosis.

Hepar sulph.—Cough deep, rough, barking and excited by the least cold striking the body; rattling of tenacious mucus in chest; almost complete loss of voice; raw, scraped feeling in throat, with sensation as if splinter were sticking there, worse on swallowing; chilliness in open air; high fever with perspiration; sweats on slightest exertion; stitches and pains in palms of hands and soles of feet.

Ipecac.—Audible, coarse rattling of mucus in chest; intense nausea and long-lasting vomiting; dyspnea, with short, wheezing respirations; paroxysms of violent, convulsive coughing, so violent that child turns blue in the face and becomes rigid; paroxysms of cough cause nausea and vomiting.

Phosphorus.—Voice hoarse, husky and rough, cannot speak above a whisper mornings; short, dry, convulsive metallic cough; dyspnea, with pain in chest; expectoration of bloody, frothy, tenacious, purulent mucus; rawness in larynx, with difficult expectoration; palpitation of heart; pulse small, full, hard and rapid, or weak and compressible; extreme emaciation and weakness; loss of appetite, with nausea and vomiting; diarrhea, stools watery, green and streaked with blood.

Pulsatilla.—Hard, dry cough at night, but loose and moist during the day, aggravated by warmth, and when lying down; difficult expectoration of thick, yellow, saltish mucus; thirstlessness; cannot retain fatty foods, vomits them as soon as eaten; diarrhea of green, slimy mucus, or feces mixed with mucus, preceded by rumbling; involuntary micturation in little girls, especially while coughing. Especially useful in light-complexioned children.

Sanguinaria.—Breath and expectoration exceedingly offensive; throat sore, dry and feels as if denuded; cough dry and hacking; severe dyspnea and difficult expectoration; pain in right chest, extending to shoulder; circumscribed redness of one or both cheeks; hands cold, with ulcers forming about the nails; loose stools followed by flatus.

Sulphur.—Weakness, with bruised pain in upper part of chest; stitches in chest, extending through the shoulder and back, worse on moving and when lying down; aphonia; cough dry, short and violent, with expectoration of purulent mucus; dyspnea; hemoptysis; profuse nocturnal perspiration; itching in rectum, with soft stools; no appetite; scrofulous subjects with boils, abscesses and enlarged glands.

CHAPTER XII.

PLEURITIS (PLEURISY).

PLEURISY is an inflammation of the pleural membrane, attended in all cases with an exudation into the pleural sac of serum or sero-fibrinous fluid, which has a strong tendency to become purulent. It may be primary or secondary, acute or chronic, circumscribed or general. It is less frequent in children than adults, but is by no means rare even in young infants. It affects the two sexes in about equal proportions, although some authorities have noticed a slight preponderance in boys. In Goodhart's experience, empyematous pleurisy affected the left side more often than the right, in the proportion of four to one. In uncomplicated cases—that is to say, when not associated with phthisis, pneumonia, or septicemia—it is nearly always unilateral. The pleurisy of childhood is more apt to be purulent than sero-fibrinous.

Etiology.—Primary pleurisy is most common in the spring and fall, when the weather is changeable, and ordinary colds and catarrhs are prevailing. Children who are enfeebled by previous illnesses, or neglect, or whose constitutions are below par by reason of hereditary influences, are most subject to the disease. "Taking cold" is probably the chief cause of the affection in its primary form.

Secondary pleurisy is due to a great variety of causes. Sometimes a trifling bruise on the chest will cause it. It is frequent in acute nephritis, whether scarlatinal or otherwise. It is a common complication of tubercular disease of the lungs, bronchitis, bronchiectasis, disease of the bronchial glands, pneumonia of both kinds, pericarditis, scarlatina and acute rheumatism. It is frequently seen in connection with diseases below the diaphragm, such as peritonitis, appendicitis and affections of the liver and spleen. Probably there are many cases of pleurisy that cannot be traced to any recognizable cause, and which must, therefore, be classed as idiopathic.

The *pathology* of infantile pleurisy does not differ from that of adults, except in the greater tendency in children for the exudation to become purulent. The exudation in some cases is nearly all fibrinous, gluing the lung to the thoracic wall, and forming firm adhesions, which may last a lifetime. These are

the cases which are called "dry pleurisy." In autopsies such adhesions are frequently found, which had not attracted attention during life. In other cases, the effused liquid consists of serum, leucocytes, and pus cells. Occasionally, though very rarely, blood is effused, constituting what is known as hemorrhagic pleurisy. The liquid is usually transparent, rich in albumin, and is of a light yellow or greenish tint. When drawn off with an aspirator, it coagulates spontaneously into a soft, jelly-like mass.

The amount of fluid which is exuded in some cases of pleurisy is enormous. In the case of a child twenty-two months old, a pint and a half of fluid was found in the left pleural sac. Ziemssen records a case of a girl three years old, at whose autopsy two and a half pounds of fluid were found in the right chest. Heyfelder removed by thoracentesis six pints of pus from a boy of six years. Such enormous quantities as these are very exceptional. Sometimes the exploratory needle fails to find any exudation at all, the effusion being of the fibrinous variety, and being only sufficient in amount to agglutinate the pleural surfaces. It is not common to find more than a few ounces, except in rare instances. J. Lewis Smith says that at the age of four months, three ounces of fluid are sufficient to produce complete collapse of the lung, and it is stated that this same amount in a child a year old will give rise to well-marked flatness on percussion. Any considerable amount of fluid in the pleural cavity must, of necessity, produce compression upon the contiguous lung, and when occurring in the left chest, it may seriously embarrass the action of the heart.

The heart itself may be pushed into the left axilla, or crowded over to the right of the sternum. The natural tendency of the effused liquid is to press the ribs apart and to produce a bulging of the intercostal spaces; but in young infants, the lungs collapse so readily from pressure, that but little distension may be noticeable, unless the chest is half full of fluid. Where the effused liquid is sero-fibrinous, much of it is ultimately absorbed, while the remainder is organized into the adhesive bands before alluded to, which bind down the lungs, sometimes to the extent of producing deformity; in other cases of milder type and trifling exudation, no serious effects are experienced. It is doubtful if purulent effusions are ever absorbed. They either cause the ultimate death of the patient, or in more favorable cases, the pus is discharged, either into a bronchus or outwardly by way of an abscess. Cases have been known where the emphysema has caused peritonitis, a lumbar abscess, or has pointed into the esophagus.

Symptoms.—Pain, which is of such a marked and definite

character in adults affected with pleurisy, is more variable and of less significance in infants and children. In some instances the pain is intense, so that respiration is restricted, causing the child to hold his breath, and to fix the diaphragm, so that the breathing becomes abdominal rather than thoracic. In other cases, and these are more common, the pain is distributed over the subscapular, subclavicular, and soon over the umbilical and hypogastric regions. There is, however, great hyperesthesia over the affected areas, a sensitiveness to touch which comes from an implication of the intercostal nerves. This cutaneous sensitiveness in many cases constitutes the bulk of the subjective symptoms. No acute pain of a local kind is complained of in many cases, unless it is inquired for, and even then it is but vaguely indicated.

The acuteness of the symptoms in the outset is exceedingly variable. In some cases, especially in children past the dentition period, there may be chilliness, headache, fever, and occasionally in younger children, convulsions. Vomiting is sometimes met with; in short, the initial symptoms are so variable that in the absence of lateral pain the diagnosis is apt to be obscured. Cough is not an essential symptom in pleurisy, although it is commonly present. In contrast with these mild and doubtful cases, there are many who experience sudden and violent symptoms of unmistakable import, such as violent pain in the side, sharp in character and cutting like a knife, or incisive and piercing like a dagger. Such cases are apt to be pneumonic as to their cause (pleuro-pneumonia), and the effusion is apt to be purulent from the beginning.

The temperature in pleurisy is subject to great variations. Mild cases may have none at all, worth recording. In other cases the thermometer may register as high as 103°, or even higher. The average temperature in pleurisy is probably not over 101°–105° Fahr. In mild and medium cases the temperature falls as soon as effusion is complete, that is to say, within twelve to forty-eight hours. If prolonged beyond this period, there is likely to be pneumonia present as well as pleurisy.

In purulent pleurisy—that is to say, in nearly one-half of all cases—there is sudden and progressive emaciation. This is often rapid and extreme, and occurs in cases in which the onset is mild and the symptoms vague, as well as those which are of more violent nature. In idiopathic cases the symptoms are usually more definite and pronounced than in cases following some other disease. Indeed, as a secondary affection, pleurisy is commonly very insidious, and unless under the eye of an alert physician, may escape notice until purulent effusion has made serious progress.

In some cases there is pallor of countenance and a puffiness of the face, suggestive of Bright's disease. In such cases an examination of the urine will serve to avoid mistakes. In cases where there is great emaciation and much general prostration, there may be no elevation of temperature, except in cases where the pus has been evacuated, either spontaneously or by operation. In these latter cases, a reformation of pus is immediately followed by a rise of temperature. Diarrhea and sweating are also indicative of pus formation, either primarily or after operation. As a rule, in mild or moderately severe cases, the temperature runs a pretty regular course, being somewhat higher in the evening, but not showing any erratic rises, unless caused by pus.

Goodhart calls attention to a negative sign which should be borne in mind in the consideration of all doubtful cases, *viz.*, the absence of any indications of distress in breathing. He says: "Such a thing might, otherwise, be thought impossible with one or other side of the chest full of fluid. Yet not only may this be so, but even the heart may be considerably displaced without symptoms. This is noticed in the more chronic cases, and is not difficult to explain. A like phenomenon is present in many cases of phthisis, and it is dependent in great part upon the compensation which takes place as the disease progresses, the emaciated body requiring diminished action of the lung."

Physical Signs.—There are certain differences in the physical signs of pleurisy occurring in children and adults. In young infants these differences are usually very marked. In the commencement of an attack there is a diminution in the movement of the chest walls on the affected side, due to the patient's instinctive efforts to repress the respiratory action on that side, in order to lessen the pain. The respiration, is, therefore, largely confined to the unaffected side, and is hastened in consequence.

After effusion has taken place, the pain abates, and the respiration is less accelerated than at first; indeed, it may be nearly or quite normal. The bulging of the intercostal spaces, and the consequent inequality of the two sides, is made much of by some authors, but, in fact, in infants, even where there is a large amount of exudation, the bulging is often so trifling as to be practically inappreciable, either to sight or measurement. This is probably due, in most cases, to the collapse of the thin borders of the lung and semi-collapse of, perhaps, the whole lung on the affected side. This is very apt to occur in weakly infants, and especially those who have been reduced by previous sickness, even when there is no obstruction to the

entrance of air to the lungs. It is brought about by the pressure of the effused liquid, so that the lung recedes from the ribs and becomes lessened in actual size, more than enough to compensate for the space occupied by the fluid. In children with strong vocal organs, vocal fremitus will not be found over the seat of effusion, but will be marked in the axillary, suprascapular, infraclavicular, or mammary region, where the compressed lung comes in contact with the walls of the chest.

When there is fluid at the base of the chest, the apex resonance on the affected side will be modified and have a high-pitched, tympanitic note, very different from the natural, deep resonance of health. It should be borne in mind, however, that percussion does not afford the same degree of accuracy in determining the amount of fluid as in adults, because the vibratory movements of the chest are more easily set up, and the sonority of the lung much more easily brought out, and there is a much readier development of the tympanitic quality of resonance. Indeed, it is only in the later stages that we are able to determine, by percussion, the outlines of a large effusion, and the degree of displacement effected by it of adjacent organs. The physical signs to be determined by means of the stethoscope are quite inconstant in infancy, and in all pulmonary affections are so variable that no two observations are likely to correspond. The friction-râles, which are so noticeable in adult pleuritis, may be altogether wanting in infants, until after absorption has begun.

The real friction sound may be heard in some cases for a brief period, and then it may disappear for a time, to recur at some later stage of the disease. It is never present when the accumulation of liquid is sufficient to prevent contact of the surfaces. In pleuritic patients under five years, the auscultatory sounds are not modified, as in older persons, by the increase and decrease of the liquid. In such cases, it is rare not to be able to recognize the respiratory murmur when the ear or the stethoscope is placed over the effusion. It may have a weak and far-away sound, but it is still there. This is due to the small size of the chest, and the consequent ready transmission of sound from the center of the thorax to its periphery.

If the inflammation be chiefly plastic, or the exudation of liquid proceeds slowly, and its quantity be small, the respiratory murmur may be vesicular, though faint and distant, during the whole course of the attack. Sometimes, when the murmur is vesicular in the greater part of the lung, broncho-vesicular or bronchial respiration is heard over a limited area, where the effusion happens to be sufficient to produce requisite compression of the lung.

Diagnosis.—Sometimes a mere inspection of a patient suffering from pleurisy, may be sufficient to at least suggest the nature of the trouble. The face in a typical case is expressive of pain, the brow is wrinkled, and the lips compressed. The rhythm of the respirations is broken, and they are irregular and jerking; as far as possible they are repressed on the affected side and correspondingly increased on the well side. The rate is increased to meet the demands of restricted oxygenation, and remains abnormally rapid throughout the course of the disease. When the pleurisy is on the left side, and the effusion is sufficient to affect the position of the heart, the absence of its apex beat from its normal place, is a diagnostic sign of much importance. A misplaced heart apex, accompanied with acute symptoms, should always be looked upon with suspicion in this connection. When the pleuritic inflammation is circumscribed, and attended with but little exudation, the diagnosis is often attended with much difficulty. The prominent symptoms in the commencement are nearly identical with those of pneumonia. Still there are essential differences. In pleurisy, both the pulse and the respirations are more accelerated than in pneumonia, but the temperature is not apt to be so high. The evident attempt to lessen the pain by a partial arrest of the respiratory movements, is not seen in pneumonia, nor is there in the latter disease that hypersensitiveness of the cutaneous surfaces about the chest that is so marked a feature in pleurisy. Another diagnostic feature of value in distinguishing between the two diseases, results from the fact that the pneumonia of children under five is nearly always catarrhal (broncho-pneumonia), and is, therefore, preceded by more or less bronchitis. It is, therefore, gradual in its approach, and not of abrupt development, like an attack of pleurisy. The hypersensitiveness of the thoracic walls, which is present in intercostal rheumatism or neuralgia, is liable to mislead, but in pleurisy the sharpest pains are on one side and remain there, while in case the muscles are alone involved, the pains are wandering and unsteady. Phthisis is not likely to be mistaken for pleurisy, even if acute, because in this disease there is usually dullness over the apex of the lung, and an absence of respiratory murmur; while in pleurisy we find at the apex that modified resonance before alluded to. This diminished or tympanitic resonance at the apex, due to pleuritic exudation at the base, is in children almost pathognomonic of pleurisy. The advice given by some recent authorities to ascertain whether there be exudation or not, and if so, whether it is purulent or not, by means of an exploring needle, is only mentioned in order to condemn it. Such a procedure is only practiced and sanctioned

by those who have less regard for the life of the patient than for so-called "scientific diagnosis." So far as treatment goes, it makes no special difference whether the exudation is fibrinous, serous or purulent.

The effort of the physician should be addressed to reducing the inflammation, and supporting the strength of the patient, until such time as nature can bring about resolution.

Prognosis.—Simple, idiopathic pleurisy is rarely fatal, unless complicated with tubercle or pneumonia, pleurisy, even when attended with a large amount of serous or fibrinous exudation, generally clears up with great rapidity and without leaving behind any serious or permanent damage. In emphysematous pleurisy the prognosis is more grave. A chest full of pus is of necessity a serious matter. But such cases are of extreme rarity. When they do occur, of course common sense suggests the propriety of an outward evacuation of the purulent matter, by means of puncture and a drainage tube. When this operation is resorted to sufficiently early, there is every reason to hope for a favorable termination, for antiseptic surgery is to-day attended in such operations with but little danger.

Treatment.—There are two remedies of the greatest value in the incipient stage of pleurisy, which, given separately or in alternation, will frequently abort the disease, prevent effusion, and afford prompt relief to the most distressful symptoms. They are *aconite* and *bryonia*. Given early enough, they are oftentimes sufficient alone to terminate the affection and render other drugs unnecessary. If, however, the stage of effusion is reached, which often happens before the physician sees the patient, other measures and remedies may be called for. These remedies will be mentioned later. As we have seen, the patient instinctively tries to lessen his pain by suppressing the movements of the respiratory muscles on the affected side. But this requires a tiresome effort, and unaided is only partially successful. Much comfort will be experienced by placing a bandage of drilling around the chest, and making it fairly snug, but not so tight as to hamper the breathing of the well side. Perhaps a better plan than this is to apply adhesive straps over the affected side, carrying them around from the spine to the sternum, and extending them from the axilla to the base of the thorax. If the effusion is considerable, and especially if there is reason to believe that it is purulent in character, no time should be lost in performing the operation of thoracentesis. When performed with due regard to antisepsis, the operation is practically unattended with danger. In any event, the danger is trifling when compared to that of empyema. The symptoms

that render this operation necessary are signs of depressed vitality, anxious and hurried breathing, weakened pulse and livid or cyanotic countenance.

As heretofore stated, bulging of the intercostal spaces affords no criterion by which to judge of the amount of fluid in the chest, and there is no positive means of determining the character of the fluid, except by using the trocar or exploring needle. In some instances the operation may need to be repeated, in which case a free incision should be made through an intercostal space, and a suitable drainage tube left to keep the cavity free from further accumulation.

The method of performing this operation and the precautions necessary to be observed, more properly belong to works on surgery, to which the reader is referred.

Remedies.—Aconite in first stage; fever; pain, sharp or lancinating in character; anxiety; restlessness; dry cough; chills or chilliness; indeed, all of the symptoms of acute pleurisy.

Bryonia.—May be alternated with aconite or given alone, if the first remedy does not quickly show amelioration of symptoms. It is a most useful remedy all through the attack, and especially in secondary pleurisy of the plastic variety, which is circumscribed in extent. The severe, sharp pains are aggravated by every motion. There is great thirst, tongue coated white, and there is experienced much relief by patient lying on the affected side.

Cantharides.—Jousset extols this remedy most highly. He uses it in the third dilution usually, but if this does not show prompt alleviation he descends to the second or first dilution, or even the mother tincture. Its special symptoms are: a profuse serous exudation, great dyspnea, cough and palpitation of the heart, a tendency to syncope with heavy sweats and scanty urine.

Arsenicum.—Great prostration and tendency to collapse. The effusion is rapid and copious. In empyema this is the prince of remedies.

Apis mel.—Great dyspnea; the patient is unable to lie down, and feels as if he could not draw another breath. The urine is scanty. The action of this drug is in the main very similar to cantharis. Both are useful after effusion has taken place.

Hepar sulph.—In chronic cases, and when the exudation has become purulent; there are intermittent paroxysms of hectic fever; the face has a dirty, yellowish tint; very useful in scrof-

ulous and lymphatic subjects. This remedy, with arsenicum and *silicia*, will work wonders in many cases.

Merc. iod.—This remedy is indicated in cases where the absorption is slow or negative; useful in cases where the effusion is serous or sero-plastic. It is also useful when the exudation tends from the first to become purulent; chilly sensations; burning heat and copious sweats. See also *asclepias*, *kali iod.*, *hellebore*, *lycop.*, and *rhus tox.*

PART X.

GENERAL DISEASES.

CHAPTER I.

CEREBRO-SPINAL FEVER (EPIDEMIC MENINGITIS; MALIGNANT MENINGITIS; SPOTTED FEVER).

Definition.—Cerebro-spinal fever is a specific, non-contagious inflammation of the meninges of the brain and spinal cord, having an abrupt beginning and an indefinite termination. In non-fatal cases it is apt to be followed by serious and lasting sequelae, such as paralysis, total or partial, loss of sight or hearing, or protracted disease of the kidneys. It has no premonitory stage, but attacks its victims in the midst of perfect health, and is sometimes fatal in a few hours. More often it pursues an erratic course, with frequent exacerbations, and terminates in recovery or death after weeks or months of suffering. It is not confined absolutely to early life, although a large proportion of cases occur under five years of age. Dr. Sanderson's statistics, covering an epidemic in which there were two hundred and thirty-five deaths, showed that all but seventeen were under fourteen years of age. Like the eruptive fevers, it is strongly inclined to be epidemic, and in most of the large cities it is now endemic.

History.—Notwithstanding the fact that this disease has been found in certain localities in nearly every civilized country, and is everywhere attended with frightful mortality, it is scarcely mentioned by a single European writer on diseases of children, and only one American author seems to have given it more than casual attention. This is doubtless due to the fact that the disease has been generally confounded with either simple or cerebro-spinal meningitis, which is altogether a different affection.

The only clear and full account of cerebro-spinal fever which we have been able to find is from the pen of J. Lewis Smith, in the sixth edition of his valuable work on the "Diseases of Infancy and Childhood," from which much of the following

description has been taken. He says if there were cases of the disease prior to the present century they must have been unrecognized.

The history of the disease in this country previous to 1860 is very uncertain and indefinite. Since that date it seems to have become established or "naturalized" in many cities of the United States, and for some years not a week has passed without the report of deaths from this cause in New York, Philadelphia, Jersey City and Chicago. It is probably also permanently established in all of the large cities as far west as San Francisco.

In New York City a severe epidemic began in December, 1871, and continued during the first half of 1872. Many of the cases which recovered from the attack did so with permanent loss of sight or hearing. During 1872 there were seven hundred and eighty-two deaths from the disease within the city limits, most of which were of children. In this epidemic many of the lower animals were attacked, especially the jaded horses of the city car and omnibus lines. Since this time the disease has been firmly established in that city, and the annual mortality has ranged from ninety-seven, in 1878, to four hundred and sixty-one in 1881. Prof. Stillé states that between 1863 and 1882 it has caused two thousand and forty-nine deaths in the city of Philadelphia. It is uncertain when the disease made its first appearance in Chicago, but that it is firmly established here now is evidenced by the fact that in 1885 one hundred and forty-two deaths were recorded from this cause, and it occupies a more or less prominent place in the annual mortality list since then. The smallest number of deaths in any one year since 1885 was in 1887, when there were eighty-one fatalities, and the largest was in 1891, when the number was three hundred and one. It has been observed in Cincinnati, St. Louis, Milwaukee, Denver, Detroit, New Orleans and Mobile, and it has doubtless obtained a footing in every considerable city in the land.

Etiology.—The direct or immediate cause of cerebro-spinal fever is unknown. By some optimistic members of the profession, this ignorance concerning its etiology is attributed to the scattered localities in which the disease has been observed, and to the limited number of cases thus far under observation. As we are still profoundly in the dark regarding the causation of measles, scarlatina and diphtheria, after centuries of investigations, based upon millions of typical cases, it is probable that some time will elapse before the exact nature of cerebro-spinal fever will be positively known.

We do know some things, however, about the predisposing causes. Thus, while one hundred and sixty-six epidemics

occurred in Europe and the United States in the six months commencing with December, only fifty were in the remaining six months of the year. Prof. Hirsch collected statistics of a large number of epidemics occurring mostly in Central Europe, and found that fifty-seven were in winter, or winter and spring, eleven in spring, five between spring and autumn, four commenced in the autumn and extended into winter or the ensuing spring, while six lasted the entire year. This authority expresses the opinion that the excess of epidemics in the winter months is due mainly to the greater crowding and less ventilation in the domiciles during the cold than during the warm months, especially among the European peasantry. Dr. Smith says that in New York City, where the state of the domiciles is about the same the year round, the season appears to exert little influence on the prevalence of the disease. All authorities agree that anti-hygienic conditions increase the liability to cerebro-spinal fever. It has prevailed extensively in barracks where soldiers were closely crowded together, and is very fatal among the poor in the New York tenement houses. Dr. Smith narrates many striking examples, which show that foul air and overcrowding increase not only the number, but the malignancy of cases.

Some facts observed in certain epidemics would tend to show that the disease is mildly contagious. Hirsch is quoted as authority for the following example of its occasional contagiousness. A young man sickened with cerebro-spinal fever on February 8. The woman who nursed him returned to her home in a neighboring village, and there died of the same disease on February 26. To her funeral mourners came from a neighboring township, and after their return home, three of them died with the same disease, one within twenty-four hours, another on March 4, and a third on the 7th. Smith relates a case of a boy who died of the disease on a Saturday or Sunday, and whose mother was taken ill two days after washing his bed linen, as well as her young infant, both perishing from the same disease. It has been observed, however, that where multiple cases occur in a family, the disease begins at such irregular intervals in the different patients that there can be little doubt in most instances that it is not communicated from one to the other, but, like the fevers from marsh miasm, is produced by exposure to the same morbific cause, existing outside the individuals, but within or around the premises.

Numerous instances are cited in proof of this position. The strongest evidence of its non-contagiousness is afforded by the fact that a large majority of the cases occur singly in families, although no attempt is made to isolate the patients. In the

few cases which we have ourselves observed, there has been no extension of the disease to other members of the family, although there were other children of various ages having unrestricted intercourse with the sick room. It is highly probable, therefore, judging from all the evidence pro and con, that the disease is only mildly contagious, if it be contagious at all, and if numerous cases in a family are affected, it is from the same original cause, acting upon all alike, rather than from direct contagion. The question has been discussed as to the possibility of the disease being communicated from animals to mankind. No instances of the kind have been observed. During the epidemic which prevailed in New York in 1872, those who had charge of the infected horses, as the veterinary surgeons and stable men, did not contract the malady, at least no more frequently than others who were not so exposed.

In some instances, an exciting cause of the disease seemed to be some depressing emotion or unusual excitement. It is probable that an individual exposed to the epidemic influence may have the disease precipitated by anything which suddenly lowers the vitality, whether it be protracted loss of sleep, abstinence from food, mental taxation, fright, or unusual excitement of any kind. Such exciting causes as those just mentioned cannot obtain in all cases, for numerous instances have occurred in infants of three and four months of age, who are not presumed to be subject to disturbances of this sort. When occurring as a primary disease, and its occurrence thus is the distinguishing feature between it and acute meningitis, it probably affects susceptible infants and children who, in addition to susceptibility, are exposed to some malign influence, which affects the meninges by some power of election inherent in the poison itself or determined by some accidental circumstance, which either shocks or exhausts the nervous energies. While there are ample facts to justify the observations which have been made as to the epidemic tendency of the disease, it very often occurs sporadically. In this city (Chicago), while cerebro-spinal fever has been endemic for many years, there has at no time been what could be called an epidemic in any particular ward or section. The disease has affected widely separated individuals in different portions of the city, differing greatly in this respect from scarlet fever, measles and typhoid.

Symptoms.—A typical case of cerebro-spinal fever, which recently occurred in our private practice, may here be cited as an example of its clinical history:

Herbert G., eight years of age, a bright, healthy and well-developed lad, came home from school on the 19th of January last, at four o'clock in the afternoon, complaining of severe

headache. He usually came home at half-past three, but this day he had been somewhat unruly, and the teacher had kept him for a half-hour by way of punishment. The misdemeanor was a slight one, but he had persisted in doing what he was told not to do. He made no complaint to the teacher of feeling ill. He had gone to school in the morning as vivacious and well as ever. He said nothing of feeling ill when he came home at noon for lunch. But when he came home at four o'clock, he complained bitterly of his head and his right ear. He laid down on the lounge, and at six o'clock, his supper hour, he tried to drink some milk, but immediately threw it up. An hour after he had a spasm, or rather a succession of spasms.

I saw him a little before eight o'clock that same evening. The convulsions had then ceased. But he was unconscious and rigid. His head was drawn back, but there was no opisthotonos. His arms were stretched out and rigid, as were also his legs. Both pupils were dilated, the left one much more than the right, and both were insensible to light and touch. The face was somewhat bloated and intensely red. His bronchi were filled with frothy mucus, and his respirations were quick and accompanied with coarse, rattling râles. His pulse was rapid and full. As he could not be induced to swallow, he was given a hypodermic injection of ergotin, cold applications were applied to his head, and mustard leaves to the soles of his feet. These measures were continued at intervals for a couple of hours, when he died, without a recurrence of spasms or a return of consciousness. The duration of the attack lasted just six hours. Inquiry made at the school next day failed to elicit a single fact that shed any light on the case. He had his lessons and behaved just as usual, except for persistently sticking one foot out into the aisle, after being reprimanded by his teacher for so doing. He had received no injury from a fall or otherwise, and up to the time of his leaving school in the evening he seemed to have been in perfect health. He was an apt student and ambitious to learn. His teacher said that he was usually very obedient and tractable, but for a week or two prior to his sickness and death, she had noticed that he had spells of being somewhat sullen and a trifle willful. At home he was fond of showing off his acquirements, and was always lively and happy. He had never had previously any sickness of any magnitude. There were three other children in the house at the time of his death, all with unrestrained liberty, but none of them contracted the disease.

This case is typical, in that it exhibited all of the peculiar features that distinguish this from the ordinary form of meningitis. Dr. Smith, from whom we have gathered much infor-

mation as to the history of the disease, and its symptoms in New York, says: "Cerebro-spinal fever rarely begins in the forenoon, after a night of quiet and sound sleep. . . . The commencement is usually without premonitory stage, and sudden—unlike, therefore, the beginning of other forms of meningitis, which come on gradually, and are preceded by symptoms which, if rightly interpreted, direct attention to the cerebro-spinal system. . . . The ordinary mode of commencement is as follows: the patient is seized with vomiting, headache, and perhaps a chill or chilliness, so that there is a sudden change from perfect health to a state of serious sickness. . . . Children often have clonic convulsions, in place of the chill, or immediately after it, partial or general, slight or severe. Stupor more or less profound, or less frequently delirium, succeeds. In the gravest cases, semi-coma occurs within the first few hours, in which patients are with difficulty aroused, or profound coma, which, in spite of prompt and appropriate treatment, is speedily fatal. Those thus stricken down by the violent onset of the disease, if aroused to consciousness, complain of severe headache, with or without, or alternating with, equally severe neuralgic pains in some part of the trunk, or in one of the extremities. The pain frequently shifts from one part to another. Among the early symptoms of cerebro-spinal fever are those which pertain to the eye. The pupils are dilated or less frequently contracted, and they respond feebly or not at all, to light, if the attack be severe and dangerous; often they oscillate, and occasionally one is larger than the other. Vomiting with little apparent nausea, and often projectile, is common in the commencement of cerebro-spinal fever. It occurred as an early symptom in fifty-one of fifty-six cases observed by Dr. Sanderson. In ninety-seven cases occurring in New York, most of them observed by myself, but a few of them related to me by the late Dr. John G. Sewall, vomiting occurred as an early symptom in sixty-eight cases. Its absence on the first day was recorded in only three cases, while in the remaining twenty-seven cases the records of the first day make no mention of its presence or absence. It was probably present in most of these twenty-seven cases as one of the first symptoms."

Clonic convulsions are very common in the commencement of cerebro-spinal fever, but tonic muscular contraction and rigidity are still more so. This rigidity of the extremities is so constant a symptom in the disease, occurring even in cases which have been without spasms, that it has great diagnostic value. It sometimes lasts for days, or even weeks, before relaxation takes place.

The mental state of those patients who are not rendered

unconscious by the violence of the attack, is one of apathy or indifference.

The intense headache, which is referred to the top of the head in some cases, and to the occiput or frontal region in others, is present in all cases. It is not only a prominent initial symptom, but it continues through the acute period of the malady. It shifts about from place to place, now on top and again in the back of the head and nucha. Pains are complained of in the epigastrium, in the umbilical and lumbar regions, along the spine, and in the extremities. In the head and along the spine it is most severe and persistent. In prolonged cases, the pain abates after the first few days, and by the close of the second week is much less pronounced than previously. Vertigo generally accompanies the headache, so that the patient reels in attempting to stand or walk. In protracted cases there is partial or complete loss of appetite, depending on the severity of the attack and its attendant pain, and more or less emaciation ensues in consequence. Vomiting, which, as has been stated, is of common occurrence, may be an early symptom, and last but a few hours; or return at irregular intervals during the progress of the disease. It is like all vomiting in cerebral cases, without nausea and attended with little effort.

The tongue is usually moist and but slightly furred. The sordes and brownish fur, which are so common in typhus and typhoid fever, are seldom or never seen in cerebro-spinal fever.

In severe cases inability to swallow is an early and a prominent symptom. The pulse is generally more or less accelerated, and the heart's action is more rapid in proportion to the severity of the attack. In exceptional cases, where there is compression of the brain, from an abundant exudation, there may be a pulse subnormal in rapidity. The temperature in this disease is subject to great and rapid fluctuations. In mild attacks it may not average above the normal, especially during the first few days, while in severe cases a higher temperature has been recorded than in any other disease. Fluctuations in the temperature occur not only from day to day, but at different hours of the same day. Smith mentions one case in which the thermometer registered 107 2-5° Fahr. This was in the commencement of an attack, the patient being two years old. Great and sudden variations of both pulse and temperature are characteristic of the disease, and have, therefore, considerable diagnostic value in obscure and doubtful cases. The skin is often the seat of papilliform elevations, the so-called goose flesh of the laity, and in cases where the temperature is reduced, there is a dusky mottling of the cutaneous surface in severe or grave cases, which has given rise to the name "spotted fever,"

by which it is sometimes known. In some epidemics there has been noticed a tendency to extravasations of blood under the cuticle, resembling bruises in appearance; but this is seen only occasionally, and apparently never in Europe.

The anatomical and pathological changes which occur in the course, and as a result of the disease, do not differ materially from those seen in other forms of meningitis, except that they are more general and less localized. In cases of great severity, the inflammatory exudation, fibrinous or purulent, or both, covers nearly, or quite, the entire surface of the brain. As to the nature of the malady and its differential diagnosis from kindred affections, Smith thus sums up his views: "The theory that cerebro-spinal fever is a form of typhus, once had its advocates, but it is now so generally discarded as untenable and absurd, that it would be a waste of time to consider the facts which differentiate the two maladies. Cerebro-spinal fever should, therefore, be considered as distinct from all other diseases, a malady *sui generis*, and in nosological writings it should be classified with those constitutional maladies which have specific causes."

Duration.—The duration of cerebro-spinal fever is very variable. In some epidemics, and even in sporadic cases, the attacks are so intense that the system does not withstand the shock but a few hours. In other cases, seemingly mild at the commencement, the disease is subject to many exacerbations, and runs a very protracted course. Cases are recorded which lasted for one, two and three months. The after-effects in those which recover are often interminable. Smith records a case of a child three years of age who lost her speech on the second day of cerebro-spinal fever, and who was unable to articulate even the simplest word for two and a half months. Finally, she began to utter slowly and with difficulty, the easiest monosyllables, and after the lapse of more than a year, her speech was slow and lisping, her hands were tremulous and unsteady, she was easily fatigued, and cried often from oversensitiveness. There are mild cases, however, of so indefinite a type as scarcely to be recognized, and many others whose duration is favorably terminated, either naturally or by treatment, in a few days or even hours. As has been truly said, "There is probably no disease which falsifies the predictions of the physician more frequently than cerebro-spinal fever." Grave initial symptoms are sometimes quickly dissipated, and do not relieve, while a mild onset not infrequently takes on a graver aspect, and terminates fatally after a protracted siege, or a slow and tedious convalescence follows, after prolonged suffering.

Diagnosis.—The diagnosis of cerebro-spinal fever from the other and more common forms of meningitis, is usually not difficult. In the former, the onset is sudden, and the maximum intensity of symptoms is reached at a bound, or at least in the first few days; while in the latter, there is a gradual and progressive increase of symptoms from a comparatively mild commencement. Moreover, ordinary meningitis is generally a secondary affection, being due to tubercle, bronchitis, pneumonia, or other disease, and is, therefore, preceded and accompanied by symptoms which are directly referable to the primary disease. Cerebro-spinal fever, on the other hand, begins abruptly in a state of previous good health. Again, in cerebro-spinal fever, after the second or third day, there is marked hyperesthesia, retraction of the head, and other characteristic symptoms, which are either not present or are less pronounced in ordinary meningitis. In the suddenness of its onset, and the nature and violence of its initial symptoms, cerebro-spinal fever is apt to be mistaken for scarlatina. But in the latter affection there is always more or less angina, and a few hours later the characteristic efflorescence appears on the skin. The peculiar fluctuations of pulse and temperature in cerebro-spinal fever will also aid in establishing the diagnosis. Scarlatina rarely, if ever, has the intense, almost unbearable, and shifting cephalalgia which is common to the other disease.

Prognosis.—Cerebro-spinal fever is justly regarded as one of the most dangerous maladies of childhood. It is to be dreaded, not only on account of the great mortality which attends it, but also on account of its protracted course, the suffering which it causes, the possible permanent injury of the important organ which is principally involved, and the not infrequent irreparable damage which the eye and ear sustain. Under five years of age, the prognosis is more grave than when the disease attacks older children. At any age, an abrupt and violent commencement, profound stupor, convulsions, active delirium and great elevation of temperature, are symptoms which should excite solicitude and render the prognosis guarded. If the temperature remains above 105° Fahr. for a considerable time, death is probable, even with moderate stupor. Numerous and large petechial eruptions show a profoundly altered state of the blood, and are, therefore, a bad prognostic, and so is albuminuria, since it shows great blood change, or nephritis, while other organs than the kidneys are probably also involved.

A mild commencement, with general mildness of symptoms, as the ability to comprehend and answer questions, moderate pain and muscular rigidity, some appetite, moderate emaciation, little vomiting, etc., justify a favorable prognosis; but even in

such cases it should be guarded till convalescence is fully established.

Treatment.—The treatment of cerebro-spinal fever must be palliative as well as medicinal. There is intense hyperemia of the brain and spinal cord, and our efforts must be directed to relieve this as speedily as possible, and subdue or diminish the inflammation. A hot mustard foot bath, or a general hot bath, in cases in which convulsions are present or threatening, is a useful measure, as it is calmative and acts as a derivative from the hyperemic nerve centers. Ice bags should be applied to the head and nucha, and maintained there as long as there is no chilliness produced, and there is some relief experienced from the intensity of pain. Cold may be applied also along the dorsal and lumbar vertebra, in severe cases, as well as to the head and neck.

The sick room should be kept very quiet, and the number of attendants reduced to the minimum. All noises intensify the cephalalgia, and too many people about only aggravate the nervousness, which is already, in many cases, extreme. In the way of internal treatment, Dr. J. Lewis Smith recommends very highly the use of *bromide of potassium.* He says it has been proven by experiment that it causes contraction of the minute vessels of the nervous centers, so as to diminish the hyperemia, and at the same time it diminishes in a marked degree the reflex irritability of the spinal cord, two of the most beneficial and important effects of its use in this disease.

In ordinary cases, not attended by eclampsia or symptoms which show that eclampsia is threatening, he gives four grains every two hours to a child of two years, and six grains to a child of five years. If eclampsia occurs, the bromide should be given more frequently, as every five or ten minutes, till it ceases. He gives the crude drug, dissolved in simple cold water. He states that he has rarely observed bromism in children who have received these doses, and never to the extent of doing any serious harm. This drug would seem to be quite homeopathic to cerebro-spinal fever, for a toxic dose of it produces exactly the symptoms we see exhibited in a typical case of this disease, *viz.*, muscular weakness, dilated pupils, with, perhaps, impaired vision, unsteady gait, nausea or vomiting, and abdominal pains. It would be difficult to find a drug whose pathogenesis presents a clearer picture than this of the acute stage of cerebro-spinal fever.

Ergot is another important remedy, whose action, however, is more physiological than homeopathic. It perhaps need not be excluded from our armamentaria on this account. Ergot has a remarkable power over the circulation, contracting the

arterioles and diminishing the flow of arterial blood. It may be given in the fluid extract, tincture or wine of ergot. Where there is irritability of the stomach, or inability to swallow, it may be given conveniently in the form of ergotin, which is the alkaloid to which the beneficial effects of secale cornutum are due. This may be given hypodermically, dissolved in water with glycerin.

The dose for a child two years old is $\frac{1}{25}$ of a grain. Of the fluid extract of ergot, the dose for an infant is one to three drops in water, equal parts. *Gelsemium* in first dilution, is another valuable remedy, and so are *aconite* and *belladonna*. When eclampsia is present or threatening, *cuprum* must not be forgotten, nor *zincum*. *Glonoin*, from the intensity of its symptoms, especially those of the brain, should make it a remedy of prime value. Besides these drugs, consult *hyoscyamus*, *helleborе*, *stramonium*, *opium*, and *veratrum viride*. Great watchfulness should be exercised during convalescence to prevent exacerbations. Study and all mental excitement should be strictly prohibited until some time after full recovery. As bad sanitary conditions are credited with being conducive of the disease, these must be remedied, and the patient provided with well-ventilated rooms, and given plenty of fresh air and food. When paralysis ensues, it must be treated the same as when occurring from other causes.

CHAPTER II.

INFANTILE TYPHOID FEVER.

SYNONYMS. — *Enteric Fever; Infantile Remittent Fever; Typho-Malarial Fever; Typhus Abdominalis; Continued Fever.*

Definition.—According to the best authorities, the definition of typhoid fever is, an acute infectious disease, lasting from ten to twenty days, or longer, characterized by gastro-intestinal catarrh, febrile movement of continued type, marked prostration, rapid wasting, mild nervous symptoms, and, in a certain proportion of cases, a scanty and scattered eruption of rose-colored spots, which disappear on pressure and are developed in successive crops.

But the folly of considering and treating disease by name, is nowhere better illustrated than in the fevers which are so common in early life, the symptoms of which are in many cases totally unlike those ascribed to typhoid fever in adult life.

A typical case of typhoid in the adult is almost unmistakable. No other disease runs a more regular course. The prodromal symptoms are very significant. The mental state is not like that of any other fever. The tenderness over the ileo-cecal region is usually pronounced. The temperature curve alone is almost pathognomonic. From start to finish the disease is accompanied with signs of fairly plain significance. But this is not the case with infantile typhoid. In early life—that is to say, under ten or twelve years of age—the disease does not exhibit those clearly defined symptoms that characterize it in after years.

For example, a child is taken ill and has fever; the fever remits in the morning, and increases at night; there is anorexia, headache, nausea, nervousness, perhaps delirium; the tongue becomes dry and furred down the center; the bowels are at first constipated, then loose; the fever continues day after day, with the same morning remission, the same evening exacerbation; there is more or less meteorism, and the surface over the bowels is sensitive to the touch. But is this typhoid?

There are no rose-colored spots; no regular gradation of temperature; no swelling of cervical glands, no symptoms of pneumonia, and there is no indication of scrofulosis or tuberculosis. The only objective sign of unmistakable import is

persistent fever. This symptom continues with some modifications and variations for days, or even weeks, until at last, after great loss of strength and flesh, we find a subnormal temperature, lasting for several days, a slow return of appetite, a gradual renewal of health and strength, and, after a tedious convalescence, the child is quite well again.

But was this a case of typhoid fever? The difficulty has long been a puzzling one. It has led some German authorities —Lebert among others—to adopt the term "infective *gastritis*," for febrile attacks of this kind. Certain English authors have attempted to bridge over the difficulty by employing the still looser expression, "*gastric fever*." It may be repeated that typhoid fever, as seen in infancy and early childhood, does not present those clearly-defined symptoms which characterize the affection in adult life. Indeed, it holds so loosely to the type, that the landmarks are practically lost. The use of the term "typhoid" under any circumstances, regardless of age, is a misnomer, and is open to serious objection. It presupposes that a more or less close relationship exists between it and typhus, when in reality no such relationship exists. The use of the term *enteric fever* in this connection is equally objectionable, for the very good reason, that in children there is no constant abdominal lesion attendant upon the disease, as there is in adults, and so we have, under the nomenclature, an enteric fever without any enteric involvement.

Infantile remittent does not quite cover the requirements of the case, because all fevers of infancy are subject to remissions and exacerbations, and the use of the term is at best so indefinite that it is fast becoming obsolete.

Retaining the term typhoid, however, we shall include under this head all of those fevers of childhood of an infectious nature and continued type, charging up this indefiniteness of characterization to the versatility and inaccuracy of the disease itself. Continued fever, unless due to subacute and protracted entero-colitis, is rare in infancy, but becomes more and more prevalent from five to six years of age upward.

Etiology.—From what has just been said, it must be apparent that no one cause can obtain in all cases of the disease. Even in those cases which are unmistakably specific in character—with enteric involvement, typical temperature, rose-spots and bronchitis—the direct cause is in many cases doubtful. The disease, even in adults, is only mildly contagious, and then only through the medium of the evacuations. It is undoubtedly spread by means of contaminated drinking water, milk and possibly ice. Among the causes which are worthy of mention in this connection are breathing impure air from sewers,

cesspools or cellars containing decaying vegetables. But these causes abound so frequently without producing typhoid fever that they must be regarded as predisposing rather than direct causes. Changing residence from country to city has frequently been noted as a conducing cause, age and other circumstances being also considered. To our mind, the autogenetic origin of typhoid fever has never received the consideration which it is entitled to. Mention has already been made of the fact that certain German authorities speak of the disease as infective gastritis, meaning, as we take it, that the system is infected or poisoned by its own perverted secretions. When we consider the miles upon miles of lymphatic canals, and the infinite multitude of large and minute lymphatic glands, all of which are essential to the proper and orderly conduct of the machinery of life, and that their free and unembarrassed function is absolutely necessary to carry away the products of decomposition and decay, as well as to furnish the material for the "renewal of life," it is doing no violence to logic or to the science of physiology to suppose that these living sewers, these vital emunctories, may become, under certain circumstances, carriers of filth and promoters of disease.

What is true of typhoid is also and equally true of those pseudo-typhoids which are equally or even more common in early life, and for which no better appellation has been found than continued fever. In all cases the organism has become infected, either from within or from without, and the phenomenon of fever is nature's method of disposing of the infection—a sort of cremation of morbid products and unworthy materials.

Symptoms and Course.—The fever is, generally speaking, insidious in its onset, being rarely inaugurated by the chill which characterizes its commencement in the adult. Older children may experience chilliness, or even a distinct rigor, but only in severe and exceptional cases. Headache and loss of appetite are among the early symptoms, perhaps accompanied with occasional vomiting. During the day there may be but few symptoms, and those of indefinite type, such as languor, dullness, or fretfulness, though symptoms of fever, with weak pulse and dry skin, are not wanting to careful observation. Towards evening the face becomes flushed, or a red, burning spot surmounts one cheek like a hectic glow, the headache is intensified, the lips become red, and the tongue dry. The child's sleep is restless and disturbed by mild delirium. As morning approaches the fever subsides, the sleep becomes more quiet and hopes are entertained of speedy recovery.

Day after day the same history is repeated. The febrile movement becomes more pronounced as the disease progresses,

the morning remission and the evening exacerbation continue, until after a time, the abdomen becomes tumid, the spleen is enlarged, diarrhea sets in, and the child becomes rapidly emaciated. Somewhere between the sixth and the twelfth day, in the majority of cases, the rose-colored eruption appears. In some cases, the number of spots is less than half a dozen. They are widely scattered over the abdomen, disappear on pressure, and reappear slowly when the pressure is removed. They appear in successive crops, each crop remaining visible for two or three days. The headache, which is more or less prominent in the initial stage in the majority of cases, ceases as the disease becomes established. Epistaxis occurs occasionally during the first week, but is not abundant nor troublesome. A mild bronchitis is nearly always present, with accelerated breathing, and more or less cough. This is usually not developed until the second week of the fever. Abdominal tenderness, especially on the right iliac region, is often present, but must not be mistaken for the hyperesthesia which is common to all fevers in children, and which is observed especially over the abdomen, chest and inner portions of the thighs.

The temperature in infantile typhoid is subject to great and singular variations. The remissions often present no regularity from day to day in the time of their occurrence. If the temperature be taken every two or three hours, it will show a remarkable irregularity, sometimes running up and down several times in the course of twenty-four hours. The acme may be reached at any hour, but there is a tendency to the occurrence of two distinct exacerbations, one at about four o'clock, and the other at nine o'clock P. M. But there is no stated regularity about it. The pulse is apt to follow the temperature quite closely in its rise and fall, but exceptions to this rule are numerous. It is not uncommon in this disease to have a temperature of 103° Fahr., or even higher, and a pulse considerably under 120.

On the other hand, the pulse may be as rapid as 150 or more, and recovery take place. In some cases, the rhythm and the force of the pulse is much disturbed, and may even be dicrotic, but a dicrotic pulse in childhood is much more rare than in adult life. Diffuse bronchitis and broncho-pneumonia occur as complications in a certain proportion of cases. In the majority of instances, the bronchitis is of moderate intensity, and ceases as soon as the fever has spent its force.

Hypostatic congestion, due to position and feeble circulation, is by no means uncommon. It is usually limited to the posterior portions of the chest and the bases of the lungs.

Symptoms indicative of disturbance of the digestive organs

are practically the same as in adults. There is generally but little desire for food during the progress of the fever, and thirst is easily satisfied. When convalescence begins, however, the appetite is ravenous and difficult to control. As a rule, the tongue is red at the edges and tip, and is covered in the center with a pasty, yellowish-white fur, which in the course of the disease gives way to a smooth, bright-red and varnished look. Sordes on the teeth and gums are not common in childhood. The lips are apt to become cracked and fissured, and covered with superficial crusts. Aphthous ulcerations also occur on the tongue and at the corners of the mouth. The condition of the bowels is extremely variable. In the commencement of the attack constipation is the rule. In its later course there is a marked tendency to diarrhea, the number of passages varying from two or three to ten or more in the twenty-four hours. The stools are apt to show the well-known appearance of thick pea-soup, and divide, upon standing, into an upper, cloudy, quite liquid layer, and a lower stratum composed of greenish-yellow masses. Except in the case of very young infants, the evacuations are under the control of the will. In very severe and critical cases only do they become involuntary.

Intestinal hemorrhage is rare in infancy and childhood, although in exceptional cases it does occur. The late Dr. Earle, of this city, had a case of fatal hemorrhage in an infant twenty-two months old. *Post-mortem* examination revealed the characteristic lesions of enteric fever. The spleen is very generally enlarged, although probably not more so, and no more frequently than in other acute infectious diseases. In cases in which the fever runs unusually high, the spleen is apt to be involved early in the course of the disease; but pain over the spleen is rare, and the enlargement of this organ begins to subside with defervescence. It has been noticed in cases of relapse that the spleen continues enlarged during the interval between the primary attack and the relapse.

The nervous symptoms in infantile typhoid fever are not so pronounced as is the case with adults. Headache is common as a prodromal symptom, and is so especially at night, during the first week of the disease. The delirium is generally moderate and mild, and confined generally to the night-time, and is sometimes associated with night terrors. It is transient and recurrent, rather than continuous, and of the type known as wandering delirium. In very young infants delirium is apt to be replaced by sudden, sharp and prolonged outcries. In older children we have the same character of delirium as in adults. Twitching of the muscles of the face and hands—the so-called subsultus tendinum—is common, but plucking at the

bedclothes, even in the worst cases, is rare in children. Enteric fever differs from scarlatina in the extremely rare occurrence of acute nephritis as a sequel. It is said that menstruation in girls at puberty is apt to be profuse and prolonged. In some cases, however, it is very scanty, or postponed until convalescence is fully established. Enteric fever does not, during its course, confer any immunity from the ordinary diseases of childhood. If anything, the reverse is true. Instances are recorded wherein measles and scarlatina have either preceded or followed the disease, or have co-existed—the eruptions merging the one into the other.

Duration.—The duration of enteric fever in childhood is very variable. Many cases last only ten or twelve days, while others last twice as long. It is probable that in many instances the fever has been in progress for several days before attention has been attracted to it. In some cases doubtless the primary fever is overlooked altogether, and the physician is called only at the time of relapse.

Diagnosis.—If we attempt to discriminate between true typhoid fever, as it occurs in infancy, and that other form which is much more common, and in which there is no evidence during life of any enteric lesion—the simple continued fever of some authors—we shall have to be very exact in our observations and very expert in our examinations. It is much easier to exclude such diseases as the eruptive fevers, malarial fevers and acute tuberculosis. The latter especially presents many symptoms that might lead to confusion. The insidious onset is the same in both diseases, and the temperature is subject to the same oscillations; vomiting is often seen in the early stage of typhoid, as well as in tuberculosis, and in the latter affection diarrhea is by no means uncommon. Only careful observation continued for quite a period of time will suffice to distinguish one from the other. It is sometimes a very difficult matter to distinguish typhoid from meningitis. The frontal headache is common to each, so are muscular tremors, and in meningitis of tubercular origin there may be pleurisy, bronchitis or even some evidence of local consolidation. In the latter disease, however, there is likely to be intolerance of light, and the temperature is not usually as high as in typhoid fever. Sub-acute enteritis or entero-colitis has many features that simulate typhoid, but in the latter there is bronchitis and cough, while in the inflammation these are wanting. There is absent also the headache, epistaxis and delirium; nor are there any rose spots. Should there be, or have been, other cases of typhoid fever in the house or family, this fact would materially aid in clearing up the diagnosis.

Treatment.—A case of fever, such as we have been considering, may be of all grades of severity. As we have seen, many cases are atypical. In some the bowels are slightly or seriously implicated; in others, not at all. It would be manifestly absurd, under such circumstances, to treat all cases alike, or to expect that any one remedy can be of universal efficacy, either to abort the fever or modify its course. There is no such remedy known. Each case must be individualized and treated symptomatically. Sometimes a single symptom may stand out with such prominence as to point to the appropriate drug, but more often the totality of the symptoms will afford a better guide.

The fact must not be forgotton that water is the great antipyretic. By its judicious use the intensity of the fever can be materially abated, and when the nervous symptoms are prominent, water is wonderfully tranquilizing. We have no words but those of censure for that heroic hydropathy that plunges a fever patient into a bath of 68° Fahr. or lower, and repeats the shock every two or three hours. Such a procedure is dangerous in the extreme. But the entire body may be sponged over with tepid water, or water and alcohol, once a day, or oftener if the temperature runs high, and with excellent results.

Where defervescence is tardy, and the skin is devoid of perspiration, the wet-sheet pack, given as directed in our introductory chapter, will be preferable to the sponge bath.

The diet of these patients is of the greatest importance. Where fresh milk is used, it should be boiled and strained, and then may be given either cold or hot, whichever is preferred.

Where the stomach is irritable, or milk does not agree, koumiss or buttermilk may be substituted. Barley water, or weak mutton broth, is permissible with older children, but beef tea and chicken broth are not suitable for any cases. Starchy foods should be avoided, for the secreting powers of the salivary glands and also the pancreas are often seriously impaired. During convalescence great care must be exercised lest the weakened digestive organs be overtaxed. At this time the food should consist of easily digested articles, such as bread and butter, light puddings, custard and meat broths; but solid food ought not to be eaten until the temperature has been normal for a week or more.

Internal Treatment—Arsenicum.—Probably this remedy is called for in a greater number of cases than any other. The more serious the case, speaking in a general way, the more appropriate is its selection. It may not be needed, as Prof. Kippax remarks, in the early stage of the fever; but sooner or later

its symptomatology will indicate that it covers a larger field of symptoms than any other one drug.

Dr. Thomas Nichol says of arsenicum: "In the most disheartening cases, cases which seem to be utterly hopeless, when the vital functions are in the grasp of a morbid poison of the most malignant kind, and the very life-blood is profoundly and completely altered, *then*, this great remedy is capable of saving life."

It is rarely indicated when both body and mind are tranquil, for *restlessness, with anxiety*, is one of its most prominent keynotes.

In the arsenicum typhoid case, the heat of the skin is dry and burning; the patient calls for water often, but drinks little at a time; the head throbs violently with pain; desire to throw off the bed covering; *great restlessness*. The pulse is small and weak, or possibly irregular and intermittent; exhaustion both of body and mind. Even early in the progress of the disease there are evidences of decomposition of the fluids of the body; the odor of the stools is very foul and there is a fetid odor to the patient's breath; the nosebleed is ichorous. Delirium is attended with tremulousness, and at night is often violent. The features are greatly changed; there is a pale, yellow, cachectic look, often livid or lead-colored. The eyes are dull, glazed and sunken; the lips dry and fissured. The stomach is tender to external pressure; spleen is swollen and painful; there is marked swelling and distension of the abdomen. There are sounds of moving flatus and liquids in the intestines. Deafness, with ringing in the ears and head. The evacuations are exhaustive; stools watery, small and yellowish, or greenish-brown and acrid. The urine is scanty and turbid; rapid emaciation; edematous swelling of the feet; circumscribed redness of one or both cheeks; involuntary urination; very tenacious mucus in the chest (*tartar emetic, kali bich.*); extensive pulmonary hypostasis, symptoms worse from 1 to 3 A. M.

Acid Nitricum.—This remedy is chiefly indicated in the advanced stage, where the abdominal lesion has become pronounced; marked tenderness of the abdomen, especially in the ileo-cecal region; gurgling on pressure, with blood-streaked diarrheic stools, which are foul-smelling, brownish, pasty or slimy. The tongue is smooth, glossy and deep red. The mental stage is irritable and excitable. Pulse irregular, and intermits every *fourth beat* (third beat *muriatic acid*). Emaciation, especially of the arms and thighs. (Kippax.)

Acid Muriaticum.—Hughes ranks this remedy with arsenicum as one of *the* remedies against the essential lesion of typhoid. It is the great remedy, not only when putridity

threatens to set in, but also when it is fully developed. The stools are frequent, foul and scanty, often blood-streaked, and the discharges are mingled with shreds of intestinal mucous membrane, and fragments of whitish mucus. The patient is extremely weak. The patient is *constantly settling down in bed;* stupor, with perfect indifference to surrounding events. The abdomen is swollen and tender, and the sphincter ani is partially paralyzed. The breath is very offensive, and the mucous membrane of the mouth is ulcerated in patches (stomatitis). Delirium continues. Glistening eyes, contracted pupils; hypersensitiveness to sounds. Excessive dryness of lips, mouth and tongue. Profuse discharge of clear, acid urine. Pulse rapid and feeble, intermits every third beat. Respiration accelerated.

Baptisia.—The time is not far away since baptisia was regarded by the great majority of homeopathic physicians as the sheet anchor—the *sine quâ non*—for the successful treatment of typhoid fever. The remedy has become indissolubly linked with the disease, but the claims which were once made for its curative powers have been much modified by clinical experience. It is undoubtedly the remedy *par excellence* during the first week. After that, if the disease is not aborted, there are other drugs possessing far more efficacy. Dr. Kippax says, speaking of baptisia: "It is capable of exciting a fever resembling that of typhoid, and of producing congestion and catarrhal inflammation of the intestinal mucous membrane, with abdominal tenderness and diarrhea, the pathological condition present during this period," the first week.

Other remedies, however, besides baptisia, are capable of doing the same thing, and it is only by noting the minutest shades of difference, that we can properly affiliate the drug to the disease. The baptisia patient feels chilly all day, and hot at night; chilliness and soreness of the whole body, with intolerance of pressure on lying. The pulse is full, soft and quick. The tongue is dry and red, swollen and thick. The stools are very fetid, and so is the patient's breath. Indeed, *fetidity* is one of the prime characteristics of this drug. The mental state of the baptisia patient is another peculiarity that will serve to distinguish it from its congeners.

There is great nervous restlessness; heavy sleep with frightful dreams, or "the patient cannot go to sleep because she cannot get herself together; her head feels as if scattered about, and she tosses about the bed to get the pieces together," or "feeling as if the lower limbs were severed from the body; sensation as of a second self alongside in bed" (*bell.*). Falls asleep in the midst of attempted conversation. Confusion of

ideas. The mental state and fetidity of all the secretions are the marked characteristics of baptisia.

Bryonia.—This remedy is also chiefly indicated in the early stages. It is especially valuable when bronchitis or pulmonary congestion complicates the fever. The bryonia patient is exceedingly irritable, and easy to take offense. Violent, oppressive, stupefying headache. Feels better from lying down; wants to go home. Buzzing in the ears, with hardness of hearing. Face red, hot and puffy. Excessive thirst for large quantities of water. Dark, almost brown, urine. Bleeding from the nose after rising or during sleep. The tongue is at first white or yellowish, but soon becomes dry, rough and dark in color. Cannot sit up from nausea and dizziness. Dry, hacking cough, with stitches in the region of the chest and liver. Pain in the back and limbs when moving. Epigastric region painful to touch and pressure.

Patient is obliged to lie perfectly quiet, because the slightest motion causes nausea; vomiting with nausea on waking in the morning. At the commencement of the fever chilliness and heat alternate, but later on the heat is intense and almost continuous. Dr. Nichols, discussing the dubious question of the possibility of aborting typhoid fever, quotes Dr. Fornils, of Philadelphia, as saying: "'I think that if any abortive power can be ascribed to any drug here, bryonia has it; its success will depend on its early application, a thing not always possible, as we are generally called too late. I am not an enthusiast, but I have seen this drug work marvels, subduing the gastric irritation, cleansing and moistening the tongue, healing the cracks, and enabling the stomach to retain liquid food, diminishing and changing the color of the stools, and finally bringing the whole condition to a favorable turn.'" Nichols, for himself, says: "Formerly I believed that no remedy could materially change or shorten this disease, but now I am of the opinion that the homeopathically indicated remedy can change the type of fever from the normal to the mild or abortive; but in order to effect this, you must begin treatment early, that is, before the disease is developed. And then you can never be quite certain that it was typhoid fever you have been treating, for in mild or abortive cases, the pathognomonic symptoms are absent. In my experience this abortifacient power has chiefly been exercised by bryonia and baptisia." My own experience is in accordance with these views, qualified by the remark that typhoid is probably much more amenable to drug treatment in early than in mature life. While the producing cause has virgin soil to work upon, so has the indicated remedy; and when taken in time, that is to say, before the disease has had time to

complicate itself, we are able to prevent the development of those special symptoms which are characteristic of the affection in mature years. May this not be the reason why we often lack, in infantile cases, those distinctive signs of typhoid, nature, unaided, being sometimes able to partially or wholly prevent the full development of the typhoid symptoms?

Rhus toxicodendron.—The symptoms which indicate rhus are somewhat analogous to those of bryonia, but the patient is from the commencement more seriously ill. In the bryonia case there is but little tendency to putridity of the fluids of the body, while in rhus patients this is very marked. When rhus is called for, the patient lies stupid and semi-comatose—so weak that when conscious he is unable to move. Watery diarrhea, often involuntary; thin, watery epistaxis; violent cough with shortness of breath; pain in the throat, as if the tonsils were swollen; slight perspiration over the whole body towards morning; bruised feeling over the whole body, with soreness in all the bones; constant desire to lie down and be quiet. The lips are dry and bleeding, and the tongue is swollen, dry, and brown. The red, triangular tip is very characteristic. Great thirst for cold drinks, especially cold milk. Pale, sunken face, with dark rings around the eyes. Sordes on teeth and gums. Baehr says: "Cases adapted to rhus never run a speedy course, nor will the crisis have to be expected previous to the seventeenth day; until then the medicine will have to be continued without fear, unless some other remedy should be indicated by particular symptoms."

Belladonna.—This remedy is indicated in cases wherein there is great cerebral congestion. The pain in the head is excessive; there is vertigo, with staggering on attempting to walk. The headache is aggravated by noise, shocks, motion, or when moving the eyes. The carotids, and, indeed, all of the cerebral arteries, beat and throb more markedly than normal; the patient is sleepless, but greatly desires sleep; frightful visions are seen as soon as the eyes are closed; sighing during sleep; sudden awakening with a start and fright; tendency to bury the head in the pillow and draw up the legs. The pulse is hard, small and rapid; face and hands cold; stertorous respiration; subsultus tendinum; tendency to coma. The delirium is furious. Visions and delirious talk of dogs, wolves, mice, giants and fire. The child does not know his nearest friends. The diarrhea is watery, profuse and painless. Perspiration.

Phosphorus.—This remedy is indicated in cases of adynamic type and where there is a complication of bronchitis and pneu-

monia. The stools are painless, profuse and either resemble dirty water or are black, like coffee dregs.

Constant sleepiness: contracted pupils; coma vigil; dullness of hearing; hard, dry cough; regurgitation of food; loud rumbling in the bowels. Typhoid pneumonia.—Hepatization of the lungs; great emaciation; epistaxis; involuntary stools; meteoristic distension of the abdomen, with rumbling and gurgling; profuse night and morning sweats; burning in stomach; low, muttering delirium; small, quick, easily compressed pulse; regurgitation of food in mouthfuls; diarrhea, aggravated by eating; feeling of fullness and distension in stomach, even after eating a very little.

Other remedies which should be consulted in cases of this kind are: *argaricus musc.*, *apis mel*, *arum triph.*, *calcarea carb.*, *camphor*, *carbo veg.*, *cinchona*, *colchicum*, *gelsemium*, *hyoscyamus*, *hamamelis*, *ignatia*, *lycopodium*, *mercurius*, *nux moschata*, *nux vomica*, *opium*, *pulsatilla*, *silicia*, *sulphur*, *sulphuric acid*, *tartar emetic*, *terebinthina*, *veratrum alb.*, *veratrum viride*, *zincum*.

The treatment during convalescence is all important. It will not do to consider the patient as well as soon as the fever has abated. A subnormal temperature nearly always succeeds the period of pyrexia, and in the early morning the thermometer may not register above 96° or 97° Fahr. The vitality is at low ebb and the greatest care is necessary in the matters of eating, drinking and exercising. In cases where there is great prostration, or in which the convalescence is protracted from weakness, alcoholic stimulants are permissible and useful, especially so when the heart's action is feeble or irregular. Wine-whey, in very small quantities, regulated according to the age of the child, may be given at intervals of two or three hours. It is prepared by adding four ounces of sherry wine to eight ounces of boiling milk, and then straining after coagulation. In sudden emergencies, a little whisky toddy may be given, *i. e.*, a tablespoonful of whisky to four of hot water, to which a little loaf sugar is added. *Vin Mariani* (cocoa wine), is an admirable wine for convalescents, and may be given in very small doses to quite young infants.

We do not like the California wines for invalids and children. They are too heady, too alcoholic, and do not set well on the stomach. Probably the best wine in the world for the purpose here indicated, is Lorenz Reich's Hungarian Tokay (Tokayer Ausbruch). It is imported direct by Mr. Lorenz Reich, of New York City, especially for medicinal purposes, and is a smooth, rich and well-aged Tokay, of absolute purity, neither acid nor oversweet. No other wine, imported or

domestic, has received such unqualified endorsement from the highest professional authorities of all schools of medical practice.

Children recovering from a continued fever, should not be sent to school until their health and strength are fully restored, which may be weeks, or in some cases months, after all fever has ceased. A sojourn in the country, for city-reared children, has a very salutary effect in promoting a restoration to health.

CHAPTER III.

INTERMITTENT FEVER (MALARIAL FEVER; CHILLS AND FEVER; MIASMATIC FEVER; AGUE).

Definition. — Intermittent fever is an endemic, sometimes epidemic, paroxysmal disease, each paroxysm consisting of a succession of definite stages, *viz.*, a cold, a hot and a sweating stage. The paroxysms are separated from each other by intermissions or apyrexial periods of varying length, during which the patient enjoys comparative health. According to the length of the intervals, the fever may be of different types, as the quotidian, the tertian and the quartan. There are also, double forms, as double quotidian, double tertian, etc.

Etiology.—Intermittent fever is due to malarial poisoning. Its miasmatic origin is universally conceded. The term *malaria* is a compound of two Italian words, *mali*, meaning evil, or harmful, and *aria*, air, and has come to signify the hurtful and disease-producing emanations from marshes or decaying vegetation. The exact nature of the poison or miasm is unknown. Certain requirements or factors are necessary to the development of the morbific agent. These are, rank vegetation, moisture and a certain average degree of temperature. Unless all three of these factors are operative conjointly, the poison will not materialize. The average daily temperature must not fall below 58° Fahr.; there must be an abundance of vegetation, and a due amount of moisture.

Malaria may enter the human system either by the respired air, or through the digestive tract, with food or drink. After it has once entered the organism, the period of its incubation varies from a few hours to weeks or months. Cases are on record in which a whole year has elapsed between the inhibition of the poison and its morbific manifestations. Other instances have been noted where a chill has been experienced within twenty-four hours after sleeping in a malarious locality. No race or nationality enjoys complete immunity from its effects; the blacks are, however, less susceptible to it than the whites.

All periods of life, also, from infancy to old age, are susceptible. The greatest susceptibility is exhibited between the ages of five and fifteen years. The weak and the debilitated are more subject to its influence than the robust. An organism

once invaded by its pernicious influence is thereby rendered more liable to subsequent attacks. A careful study of the physical conditions favorable to the development of malaria shows that it is most prevalent about marshes, swamp lands and damp bottom lands. If the low lands are saturated with salt water and subject to an occasional overflow of fresh water, the conditions for the evolution of malaria are exceptionally favorable.

Cutting off timber from new lands and exposing the damp and half-decayed vegetation beneath, to the rays of the sun, is a very prolific source of malaria. The excavations in the suburbs about Chicago, made necessary by the laying out of new streets, building sewers, placing cable tracks, making cellars, etc., etc., are at the present time giving rise to malarial diseases along the line of these improvements. Personally considered, other things being equal, all weakening influences, such as increased moisture of the atmosphere, exposure to excessive solar heat, sudden cooling of the cutaneous surface, and inordinate eating and drinking, favor the action of the malarious influence. These, each and all, act by disturbing the equilibrium of the body, and thus lowering the power of resistance.

There are other conditions, fortunately, which are inimical to the production of malaria, among which may be mentioned the extremes of latitude. Malaria is seldom generated north of 63° north latitude or south of 57° south latitude. The further we recede from the equator within these limits, the more feeble becomes the malarial poison. Again, malaria is seldom found beyond 1,000 feet above sea level; an average temperature below 60° Fahr. is always and everywhere unfavorable to the generation of malarial poison. The daytime is less favorable for the development of the miasm than is the night.

It is said that strong winds diminish the virulence of the poison, doubtless because they scatter it broadcast, and thus prevent its concentrated influence. A hot and dry atmosphere, with little or no wind, especially after heavy rains, increases it.

It has been found by experience that certain plants, such as the sunflower (Helianthus Anuus), the calamus (Acorus Calamus), and the eucalyptus, have the power of absorbing the miasm, and have been used with much success in malarious districts.

From time immemorial malarial fevers have been observed to show a tendency to ameliorate or terminate on certain days, which have been for this reason denominated "critical." This tendency has been variously explained, but the explanations are, for the most part, more fanciful than philosophical. Clinical experience, however, endorses the statement that the fever

is more apt to terminate on certain days than others. The critical days are as follows: the third, fifth, seventh, ninth, eleventh, fourteenth, seventeenth, twenty-first, twenty-seventh and thirty-first. The non-critical are the intermediate days; but the fourth and sixth are considered secondarily critical. Cases that pass the seventh day are apt to run on to the eleventh; and those which pass the fourteenth are apt to go to the twenty-first.

Symptoms and Course.—The clinical history of a case of intermittent fever, which is the commonest form of malarial poisoning, is about as follows: The prodromal or incubative stage, if present, is of variable length and is attended by indefinite symptoms, or none at all. Some patients experience a sensation of languor, accompanied by a tired feeling, with frontal headache, yawning, stretching and general malaise. The tongue is somewhat furred; the appetite is impaired or lost; there is a metallic taste in the mouth, the breath is foul and the skin takes on a dirty-yellow or icteric hue; the urine is scanty and high-colored; the fecal discharges are dark-colored and offensive. After these symptoms, or some of them, have continued for a variable period, they eventuate in a distinct rigor usually, which is the commencement of that series of phenomena which characterize the paroxysmal stage. This stage is, in a typical case, marked by three distinct divisions: first, the chill; second, the fever; third, the sweat.

When the attack presents itself every day, it is called *quotidian;* every other day, *tertian;* every fourth day, *quartan.* In double quotidian, there are two chills daily—one in the morning and one in the evening. In double quartan, there is an attack on two successive days and one day without an attack; in double tertian one chill daily, but the time of chill alternates every other day. In children the quotidian form is most common. Bohn gives the relative frequency of the three forms as 3 : 2 : 1, although this varies according to the nature of the epidemic.

As a rule, to which there are apt to be exceptions, the attack comes on between ten o'clock in the morning and one in the afternoon. There are two forms of intermittent fever and of very different gravity—the pernicious and the mild form.

The first or pernicious form, is not uncommon in infancy and childhood, and is generally ushered in with a convulsion instead of a chill. The child may be attacked in the midst of perfect health, or may be for a short time restless and feverish. Yawning and stretching are among the more noticeable prodromata. There is sometimes vomiting or one or more loose evacuations just preceding an attack. Quite as often, in this pernicious

variety, the first evidence of illness, is a turning of the face a pale or bluish-pale color, and very shortly the child has a convulsion or falls into a comatose state, from which it never rallies, remaining in this condition for one, two or more days and finally dying from asthenia, edema of the brain, or some other complication. If the first attack does not prove fatal, the convulsions gradually diminish in intensity and number, the extremities grow warmer, the bluish color and the pallor disappear, and the temperature begins to fall. After a time the child resumes consciousness, and soon is apparently quite well again. But the next day or the day after the attack is renewed, and this second paroxysm may end fatally The temperature, if taken during a paroxysm and in the rectum, is very high (104° or even 108° Fahr.). The pupils are contracted, or one may be contracted and the other dilated. The child may be comatose from the beginning, or the convulsions may precede the coma.

When the attack comes on thus suddenly, in a previously healthy subject, the diagnosis is sometimes very difficult to make. The resemblance to cerebro-spinal fever is exceedingly close. The character of the locality and the known presence of the miasm may be the only clue to the real nature of the seizure.

It is very rare indeed for these pernicious cases to terminate otherwise than fatally. In the benign form of intermittent fever, the attendant phenomena vary with age. In young infants we rarely have a complete attack—that is, a complete sequence of stages. It is asserted by some, that infants do have the chill, fever and sweat, the same as adults; but this is surely exceptional. More often one of the links is missing, and usually this is the chill, a convulsion frequently taking its place, the other stages, fever and sweat, following in their regular order. Infants who do not have a distinct rigor, may have symptoms which very nearly approach a chill, *viz.*: coldness of the nose and extremities; blueness of the lips; dark circles about the eyes, and a look of great exhaustion. If the child has just eaten, there is apt to be vomiting, or at least nausea. If convulsions take the place of the chill, as just described, they are not likely to be much prolonged—rarely lasting more than a few hours—when the next stage, that of fever, ensues. During the chill or convulsions, the temperature rapidly rises to 103° or higher, and remains there until the paroxysm is over, when it gradually diminishes, until, after the lapse of several hours, it reaches a normal or subnormal degree. The sweat that follows is profuse and exhausting, yet, strange to say, no sooner is it over than the appetite returns, the face brightens up and the child seems quite well again. After a

succession of attacks, however, the cachexia begins to manifest itself; the complexion loses its natural color, and is pale or jaundiced. The patients now become listless and lose their appetites. The spleen becomes enlarged, either temporarily or permanently, and may usually be felt by careful palpation through the abdominal walls. With older children, who are able to describe their sensations, the symptoms do not differ essentially from those seen in adults, especially in typical cases. But children are more prone than adults to suffer from the cachexia, and then we have all manner of symptoms and combinations of symptoms, which are oftentimes exceedingly puzzling.

It would be impossible to give even a *résumé* of the various phases which the malarial cachexia may assume under varying circumstances. In some cases the chill is absent, and the other stages are manifested in a partial or fragmentary form. In these cases there is more or less fever, followed by a sweat, and the periodicity may be regular or irregular. The popular name for such an attack is "dumb ague."

Oftentimes the chill and the fever are replaced by an intense neuralgia, appearing daily about the same hour, or perhaps every other day. In young children *masked intermittents* of this kind, are apt to take the form of diarrhea, dysentery or dyspepsia. But there is no disturbance of function nor disease of any organ or tissue, but may be influenced by the malarial poison, and take on a periodicity unknown to similar complaints outside of malarious localities, or at least unknown to those who have not been exposed to miasmatic influences.

Diagnosis.—It is only in masked cases, which have the cachexia, but not the regular paroxysms, that there can be any difficulty about the diagnosis. In such cases there is pretty sure to be more or less enlargement of the spleen; and the history of the case, with a knowledge of the existence of malaria in the neighborhood where the patient has recently sojourned, will, by the help of the rule of exclusion, aid in reaching a satisfactory conclusion. In a typical case of intermittent, the diagnosis is easy. There is a regular succession of phenomena and a repetition of these phenomena. In pyemia, the accession of the fever observes no regularity and there is no complete intermission. The temperature in pyemia never approaches the normal, while in intermittent fever there is a period of complete defervescence. Remittent fever usually has but one chill, while in intermittent fever a chill inaugurates each paroxysm.

In the hectic fever which accompanies pulmonary phthisis, the paroxysms occur more often in the afternoon than the forenoon, and the intermissions are incomplete. The question,

however, is as a rule easily settled by physical exploration, for in tuberculous disease the physical signs are seldom wanting.

Prognosis.—In the pernicious variety of intermittent fever, or, rather, the pernicious form of malarial poisoning—for there is, in such cases, seldom more than a single paroxysm—the prognosis is very grave. Fortunately, congestive chills—for such in reality they are—are not common, except in certain restricted regions of the extreme south. In more northerly latitudes the fever is of the benign form and seldom results fatally. The cachexia which is left by the poison, and which is very hard to eradicate from the system, is its worst feature. It not only remains as a constant menace to the health for an indefinite period, giving to each intercurrent disease a more serious aspect, but it lays the foundation for an innumerable train of chronic ills that make life a burden, if it does not materially abbreviate it. Children, however, are less liable to be permanently affected by this cachexia than are adults. They outgrow it as they mature, especially if a change of residence is effected to a non-malarious locality.

Treatment.—The object of treatment in intermittent fever is two-fold: first, to arrest the paroxysms, and secondly, to overcome the cachexia. The first is much more easily achieved than the second. There is usually not much trouble in stopping the chills. The greatest trouble is in eliminating the poison from the system or rendering it inert. More cases are suppressed than cured. For the accomplishment of the first object—the arrest of the paroxysms—there are but two drugs known that are worth mentioning, *viz.*, *quinin* and *arsenic.* It was from a study of the action of Peruvian bark, and the aggravation which he witnessed from the use of it in toxic doses, that the master mind of Hahnemann first conceived the law of similars, which is the foundation stone of our school of practice. Quinin will produce in a healthy organism all of the essential phenomena of intermittent fever—the chill, fever, sweat. It is therefore truly homeopathic to this portion of the disease, and if given in the beginning of an attack, or during an intermission, it will ordinarily prevent or arrest the succeeding attack. But it will not always do it, probably because it is not always given in appropriate doses. And it will not remove the underlying cachexia. For this latter purpose, a close study of the *materia medica* will have to be made, and the curative remedy will have to be selected with due regard to the individual case and the totality of the symptoms. In ordinary cases the dose of quinine —graduated by the age of the child—will be from one to three grains, repeated every one, two or three hours, according to the severity of the attack. The most effectual time to administer

it is during an intermission, and to get enough of the drug into the system to accomplish the desired object, it should be given frequently or freely; its use should then be suspended until the next intermission. The great objection to quinin as a remedy for children is its taste. It is intensely bitter, and there is no known means of disguising it so as to render it palatable. It cannot be given per rectum on account of the irritability which it excites. It is said to act well as a tonic when given endermically, *i. e.*, by inunction; but the skin will not absorb enough of it to act as an anti-periodic. The use of licorice or other menstrua only increases the bulk of the dose without materially modifying its taste. The best way is to give it in solution or wafer, and follow its administration with some fruit jelly or orange juice, to get rid of the taste left behind.

In cases where the stomach will not tolerate quinin, we can give the next best drug, which fortunately is tasteless, or nearly so. We refer to arsenic, or arsenicum, as we prefer to call it. In irregular cases, or those which differ from the typical form, in having the chill omitted or a prolongation of the other stages, this remedy is even better than quinin.

In grave cases, where quinin is inadmissible, and we want to check the paroxysm, we may give an infant under six months a drop of Fowler's solution, and increase the dose to two or even three drops with older children. When we give it more for the cachexia than to arrest the paroxysms, our third or fourth decimal trituration will be amply strong enough for all practical purposes. An admirable preparation, and one which has succeeded well in our hands, is the *arseniate of quinia* (*chin. ars.*). It is very successful in masked intermittents, and in mixed types of simple intermittent. We give it in 2x or 3x trituration.

It would be impossible to give the symptomatic indications for quinin, for, as Dr. E. W. Jones wisely says: "The most diverse symptomatic series have been cured by it, and in doses varying from the truly infinitesimal to twenty-grain doses of the crude drug. A remedy which is so universally used as quinin can scarcely have defined indications that will cover all of its apparent range." It does not seem to have any effect over the cachexia, unless it be to aggravate it, and never should be given except for its well-known anti-periodic power. To overcome the cachexia there are other drugs which will follow either quinin or arsenicum, and may be given with good prospects of success.

Arsenicum alb.—Increased secretion of acrid, corroding tears; face pale, waxy and expressive of suffering; tongue furred, with red streak in middle and red tip; excessive thirst; drinks often, but little at a time; drinking cold water does not satisfy

and causes nausea; no appetite, with nausea when time for fever to return; violent pain in region of stomach; stools dark, bloody, watery, offensive and very acrid, excoriating the anus and buttocks; pulse small, quick, weak, irregular and scarcely perceptible; excessive weakness and prostration; intensely restless and nervous; sleep disturbed, broken with moanings as if in pain; cold, clammy, offensive perspiration with great thirst; yawnings and stretchings before chills; paroxysms irregularly developed; chills may predominate and fever be entirely absent, or heat and fever and profuse sweat, but no chills; all symptoms worse at night and from cold, better from warmth in general. Especially useful in tertian types.

Belladonna.—Quarrelsome, irritable temper; eyes red, hot and sparkling, pupils dilated, intolerance of light, profuse bland lachrymation; face intensely hot and red; throbbing and bounding of carotids; tongue dry, red, hot, with white streak in center; intolerable thirst for cold water; sharp, painful stitches, coming and going like a flash; stools slimy, bloody, with hard lumps mixed with green mucus; pulse full, rapid, hard and bounding; spasms, convulsions; restless, throws body backward and forward; skin hot all over, with perspiration beginning at the feet and extending upward; starting in sleep, with jerkings of the head and feet; sweat stains the bed linen. Especially useful in the quotidian and congestive types of the intermittent.

Bryonia.—Very irritable, sullen and frightened; violent throbbing headache, with pains down the neck, worse mornings; face hot and with circumscribed red spot over malar bones; excessive thirst for immense quantities of cold water; tongue coated with heavy white fur, tip moist and red; nausea and vomiting, relieved by large quantities of cold water; pressure in stomach after eating causes great anxiety and distress; diarrheic stools of offensive, pasty, acrid matter, or constipation, with hard, dry stools passed with difficulty; dry, short, violent cough; exhausted and weak; stitches in joints and various parts of body, worse on slightest motion and touch; chill begins at tips of fingers and toes, thence spreading over body; chills are creeping rather than shaking; sweats on side laid on; perspiration sour, oily, profuse, offensive, and easily excited.

China ars.—Irritable, wants to be let alone; face pale and lips blue; tongue coated brown; excessive thirst, which relieves the nausea and vomiting; pulse small, weak, irregular and very high (200); extremities cold, like ice; chill in morning at variable hour, followed towards night by intense fever; prostration; spasms. Useful in the masked and poorly developed intermittents.

China sulph.—Mind first bright and excited, later, moody, dull and irritable; ringing and roaring in ears; profuse epistaxis in morning; face swollen, dirty and with sickly expression; tongue swollen, flabby and coated with thick yellow fur; great thirst, but no appetite; vomiting of sour, intensely bitter bile; painful enlargement of the spleen; dysenteric stools, stools soft, dark, frothy and accompanied by large quantities of offensive flatus; urine high-colored and deposits heavy brick-dust sediment; all senses excessively acute; very weak and prostrated after stools; chills occur at same hour with clock-like regularity; stage of fever gradually passes into perspiration, with intense thirst, which is greatly relieved by large quantities of water.

Cina.—Ill-humored, cannot be quieted; constantly boring and picking at the nose with the fingers; tongue clean, but very painful; excessive appetite all the time, is hungry after eating; intense nausea and retching, vomiting only mucus; thin, watery, painless diarrhea; face is pale, lips blue, heat and redness on cheeks; perspiration on forehead, face and hands; feels chilly, even when near a hot stove.

Eupatorium perf.—Intense aching in all the bones of the body; intense thirst for cold water, which causes vomiting; vomiting of dark-green, very bitter mucus, which causes great weakness; cannot bear weight of clothes over hepatic region; morning diarrhea, with burning in anus and rectum; back and limbs feel as if beaten and are very painful; thirst before chill and continuing during the chill and fever; vomiting of bile after chill; shivers all out of proportion to the degree of chilliness; chill in morning one day and afternoon the next day; sweating stage may be very profuse or entirely absent.

Gelsemium.—Great mental apathy or is very nervous; face flushed and hot; tongue coated yellowish white; pulse rapid with increased arterial tension; relaxation and prostration of entire muscular system; chill begins in hands and feet and extends to the back; fever very high, but no thirst; the intermissions may be very marked or entirely absent; chill usually begins in evening; very restless and sleepless.

Ipecac.—Very peevish, irritable and cries constantly; face is very cold and sunken; intense, painful and long-lasting nausea and retching continues through all the stages; saliva increased and runs from the mouth; great weakness, with jerking and twitching of the arms and legs; intermissions so poorly marked as to be unnoticeable; body feels cold, yet there is high fever; profuse, sour-smelling perspiration which stains linen yellow. Useful after abuse of quinin.

Natrum mur.—Intense congestion of the head and face, face

very shiny; lips dry, cracked and ulcerated: very bitter, salty taste in mouth mornings; tongue coated white, with sensation as if something was on it; violent, unquenchable thirst for immense quantities of water frequently renewed; vomiting of the water soon after it is drunk; intense burning pain in urethra, so that child screams when urinating; urine very pale, and copious, uric-acid sediment; rapid, weak, intermittent pulse; chill in mornings, begins in hands and feet, nails very blue; chilly stage passes directly to the fever; the chill is long-lasting, body feels very cold, but internal heat.

Nux vomica.—Irritable and peevish; dizziness with pain in head; tongue thickly coated white, with offensive breath; vomiting of very bitter, sour mucus; intense thirst, which is satisfied by milk; diarrhea in morning, with dark-colored stools, or constipated and stools light and very hard; severe, long-lasting chills, preceded and followed by heat; chills are accompanied by shakings of the whole body, with pale or blue nails; chills so severe as not to be relieved by heat and great quantities of clothing, shivers on slightest motion; heat, without sweat, and cannot uncover without shivering; sour, offensive, profuse perspiration after fever.

Pulsatilla.—Fretful, anxious, and easily frightened; dizziness and pain in the head, with nausea, which is relieved by lying down; tongue dry, white and covered with a thick, tenacious mucus; disgust for meat and fatty foods; painful diarrhea, stools mixed with green mucus, or only mucus; involuntary passage of copious, pale urine; palpitation in pulse felt in abdomen; yawns and is very sleepy during the day, wakeful at night; chill in afternoon, begins over abdomen and extends to back; fever is intolerable, begins in hands; venous congestions, no thirst; profuse sweat on one side only. Especially useful in relapses from dietetic errors.

CHAPTER IV.

RHEUMATISM.

ACUTE RHEUMATISM is not, strictly considered, a disease of early life. It does not belong especially to any age, or sex, or nationality. But when it occurs in infancy or childhood, it exhibits certain peculiarities and is attended with certain dangers, which render its brief consideration here imperative. So often does it affect the heart in childhood, causing inflammation of its valves, that endocarditis and rheumatism are almost synonymous terms. This tendency of the disease to molest the sero-fibrous tissues is so universal and so marked that any considerable disturbance of the heart's action always creates a suspicion of a preceding attack of rheumatism, and in the large majority of cases, if the family history be traced back, the suspicion will prove to have been well founded. Nor is this due to the preponderance of rheumatism over other constitutional or general maladies in parents, but rather to the fact that the rheumatic diathesis is one which is readily transmissible, and children of rheumatic parents are very prone to have endocardial trouble, notwithstanding the fact that the rheumatism from which they have personally suffered may have been so slight and transient as to have been entirely overlooked. Children are frequently brought to the physician's office or to the outdoor clinics, with a well-developed mitral lesion, whose parents will insist that they have never had an attack of rheumatism or anything like it, unless "growing pains" might be called such. Close questioning, however, will elicit the fact that these same children have more or less frequently complained of vagrant pains here and there, stiff neck, lameness, etc., which were so trifling and of such short duration that little attention was paid to them.

Inspection of the body will reveal the presence here and there of subcutaneous nodules—small bullæ—about the various joints.

These inconspicuous masses—frequently more palpable than visible—are found about the elbow, the melleoli, the margins of the patella and elsewhere; they may be solitary or in crops, are painless, and appear and disappear in the course of a few weeks, although they sometimes remain for months. They are not

pathognomonic of rheumatism, but are so commonly present in the rheumatic constitution, that they possess considerable diagnostic importance in doubtful cases. Drs. Barlow and Warner have shown that they are almost invariably associated with disease of the heart, and usually in connection with some progressive form of disease. Prof. E. M. Hale has so admirably covered the cases of heart affection from rheumatic and other causes, that nothing more need be said here upon that subject. It is only mentioned now to call the reader's attention to the subject and direct him where to find it fully discussed. See page 383 *et seq.*

Of rheumatism, in general, as manifested in early life, it may be said that children suffer, as a rule, less intensely and for a shorter period than do adults. The pain is generally less severe, and the edema about an affected joint is usually less. Indeed, the great majority of children affected with rheumatism make so little complaint about acute symptoms, that there is far more danger of overlooking the affection than of mistaking it for something else.

The copious acid sweats, which are so common in adults affected with rheumatism, are almost unknown with children. It must not be inferred from what has been said that these trifling attacks are to be ignored or treated lightly, for however insignificant the attack may be it is liable to produce serious and permanent heart damage. This is the more true the younger the patient. The so-called "growing pains;" a slight swelling of a single joint; a transient pain in the intercostals; pleurisy, pericarditis, pleurodynia, are all indicative of the rheumatic diathesis.

It is plain from this description that the symptoms of acute rheumatism in early life are often indefinite in character, but none the less serious in import. But children—even young infants—do have exceptionally the same form of rheumatism as adults, attended with a moderate amount of fever, with a joint or joints which are painful, hot, red and swollen. The swelling is due to inflammatory edema of the tissues in and surrounding the joint. This effused fluid is for the most part serum, and resembles the effusion of pleurisy. Like the pleuritic exudation, it may contain a few globules of pus, and in rare and exceptional cases the amount of pus may be so great as to constitute a true arthritic abscess. In most cases, however, the exudation is mainly serous, and hence is readily absorbed. The intensity of the pain is only felt when the affected limb is moved or the joint pressed upon. Sometimes rheumatism affects but a single joint of one of the extremities, but occasionally it invades the trunk and involves the articulations of

the vertebra, the symphysis pubis, or the costo-chondrals. There is great tendency in rheumatism to wander about so that, as the disease abates in the articulations first affected, it reappears in others either near or remote. Fortunately for the patient, it is rare that more than two or three joints are in a state of active inflammation at the same time.

In cases where the rheumatism is secondary to some other complaint, such as the eruptive fevers, it commonly affects only a few joints, often but a single one, and this is attended by but slight swelling and redness. Fluctuations are common, and just as the patient seems about to recover, the pain and associate phenomena jump to some hitherto unaffected joint or tissue, and thus the affection is prolonged. More or less stiffness is commonly left in the joints which have been involved, and this may remain for some considerable time, but is seldom permanent, unless the disease itself becomes chronic.

Treatment.—The treatment of rheumatism may be properly divided into, first, prophylactic; second, palliative; and third, curative. The youthful subjects of rheumatism are usually anemic and sensitive to atmospheric changes. This is more especially true of those who inherit the rheumatic tendency. Such children require to be well clad with woolen garments, and their feet should be well protected against dampness. Their diet should be carefully regulated and restricted in the matter of sweets and all other fermentable foods. The digestive organs of these children are easily upset, and indigestion or anything which reduces the system below par is deleterious. The rheumatic child easily takes cold, and is exhausted with equal ease. Exercise should therefore be moderate. Both study and recreation should be kept within judicious and safe limits. Everything, in a word, should be done to keep the child well in a general way. It goes without saying that a dry and equable climate is better for rheumatic subjects than a damp and changeable one.

Palliative treatment consists in swathing the affected parts with wool or cotton, which may be kept warm by being frequently reapplied. Hot fomentations with witch hazel and water—half and half—are usually very grateful. All repellant applications, as cold or irritants, are dangerous, since they invite complications. Absolute rest is every way essential. The diet should be sustaining, but at the same time bland and unstimulating. The bowels should be kept open by the use of fruits, etc., and if necessary, by the additional use of suppositories or enemata.

Curative treatment.—Rheumatism is universally conceded to be caused by an excessive amount of acid in the blood, and

therefore the exhibition of alkalies seems to be founded on reason and sense. The alkaline treatment is not only theoretically correct, but clinical experience endorses the theory. The use of *acetate of potash* and *bicarbonate of soda* for this purpose has given place to the *salicylate of soda* treatment, which is undoubtedly preferable as being more speedily efficient. By some the *salicylate of lithia* is preferred. Either drug may be given to a child of from three to five years, in doses of two and one-half grains every three hours, for three or four days, after which it need not be repeated oftener than three times a day. It may be given in syrup or any other available medium. To children past six years of age five grains may be given at a dose without a particle of danger. While *salicylic acid* combined with *soda* or *lithia* salts is being given for its chemical effects, the homeopathic remedy should be given with special reference to the local manifestations of the disease. The selection of the drug for the case in hand will depend on the site of the inflammation, the time of greatest aggravation of pain, the general condition of the patient, etc., etc.

CHAPTER V.

ADENITIS; LYMPHADENITIS (NON-SPECIFIC INFLAMMATION OF LYMPHATIC GLANDS).

THE tendency of glands in the neck and elsewhere to take on congestion and inflammation in certain persons, especially children, who either have inherited or acquired the scrofulous or strumous taint, is universally recognized, and has been mentioned by nearly all medical writers since the days of Hippocrates. Sometimes this tendency is the only clue we have to the scrofulous diathesis; but more often we have, sooner or later, the symptoms described in the last section, and are compelled to recognize the glandular swelling as part of a constitutional dyscrasia, whose depraved influence and tendency are as widespread as the bounds of the organism. But there are other cases occurring every now and again, in the practice of every physician of large experience, in which there is swelling of the lymphatics of an acute or chronic character, with but little tendency to suppuration, and in children who show nowhere else, and in no other way, any signs of tubercle, scrofula or struma. They neither have eczema nor catarrh, nor do they have the general appearance of those who are the manifest subjects of hereditary taint. All that can be said of them is that they are subject to glandular swellings. Why, in such cases, the cervical glands are more apt to be implicated than others, has been a matter of much speculation. That they are so, is beyond question. Treves gives the following table of the comparative location of glandular disease:

Neck alone	131	Axilla alone	4
Neck and axilla	12	Neck and groin	1
Groin alone	6	Neck, groin and axilla	1

Some authors endeavor to account for this great preponderance of cases involving the neck by their close proximity to the tonsils, which are the largest aggregation of adenoid tissue in the body; and this theory receives much plausibility from the fact that these glands are so frequently enlarged whenever the tonsils are inflamed. But tonsilitis is not the only proximal inflammation or irritation that may give rise to enlargement of the cervical glands. Eruptions on the skin, face and scalp,

coryza, diseases of the ear, and even dentition may also act as indirect causes. Gastric derangements, also, should be classed in this category, but beyond doubt "taking cold" is, more often than anything else, the immediate or exciting cause. That the victims of adenitis are generally delicate, highly organized and sensitive children, is true, but according to the accepted pathology of that disease, mere delicacy of organism or mere depression of vital powers would not be sufficient to produce the conditions known as scrofula. Even adults in ordinary health, and who have never exhibited symptoms that could by any possibility create a suspicion of scrofulous inheritance, may have temporary engorgement of a gland, and that engorgement may go on to inflammation and suppuration.

What is true of adults, is especially true of children, in whom the glandular structures are proverbially sensitive to peripheral irritation or to reflex influences through the sympathetic nervous system. This will be more readily understood by recalling certain facts from anatomy and physiology relative to the lymphatic glands and their function. The lymphatics themselves originate in the areolar interspaces and are everywhere present. They do not go far from their point of origin before they meet other lymphatics, with which they coalesce and expand into a lymphatic gland, with efferent ducts or lymph channels to convey the lymph corpuscles into the general circulation. Just how these lymph corpuscles originate is not known, but every efferent duct is filled with them, and anything which interferes with their progress toward the general blood-stream is productive of mischief. In children the waste and repair of tissue is very active, and the function of the lymphatics is to pick up waste products, which are mostly albuminous, and conveying them first to the lymphatic glands, bring them ultimately to the general circulatory system. All effete material or foreign substance which has found its way into an areolar interspace, is taken up by the open mouths of the lymphatics and passed through the glandular mechanism. Now, bland soluble matters, when thus taken up by the lymphatics, pass on without hindrance and without producing congestion or irritation. But it is different when the matters in transit, instead of being bland and soluble, are insoluble or irritating. Then the gland is liable to first irritation and then inflammation.

When the surface of the body is chilled, as from cold, all of the superficial vessels are contracted in consequence, the lymphatics as well as others. The effect of this contraction is to congest the glands by preventing the onward flow of the lymph corpuscles. Hence we see how easily from cold a gland may become engorged, congested, and then inflamed.

In the neck the cervical glands are large as well as numerous-being made up of innumerable small glands conglomerated to, gether. All glandular structures are in the closest relations of sympathy, and so we see how an inflammation of the tonsils, to use these organs again by way of illustration, may extend to the adjacent glands of the neck.

In scrofulous subjects, the processes of metabolism are imperfectly performed, the elaborated tissues are only partially elaborated, and the waste products are only partially soluble. Hence such persons have constant trouble from glandular disease. But others, also, are liable to glandular engorgement from cold or peripheral irritation, although at other times and under other circumstances the lymphatic system is in perfect working order, and the processes of metabolism are carried on in a physiological manner. In scrofulous subjects, glandular swellings are general in their causation, while in non-strumous subjects these causes are mostly or entirely local. Clinical experience teaches that when inflammation is set up in a gland the changes effected therein are manifested first in the deeper portions of the glandular structure, beginning in the medulla and extending thence to the cortical portions, and never invading its capsule. Sometimes, when the gland is merely congested or engorged and not inflamed, the obstructing material only undergoes partial absorption and remains a fibroid callus. A gland is then said to be indurated, and may remain in this condition indefinitely.

In other cases, the gland becomes inflamed and pus is formed; which finds a superficial outlet or burrows into the deep-seated structures, before discharging into some internal organ or tissue. We have entered into this somewhat elaborate argument to prove that all glandular swellings are not necessarily scrofulous or tubercular in their nature ; that certain glands, especially those in the neck, may be temporarily engorged, and this engorgement may go on to inflammation and suppuration, either of the gland itself or of the tissues around it, without implying any perversity of constitution or any morbidity of histological processes or products, other than those of a local and generally ephemeral character.

Symptoms.—There is one point of difference between glandular infiltration of strumous origin and that non-specific form which we are now considering. The latter is always acute and accompanied with acute symptoms, while scrofulous glands are proverbial for the chronic and indolent character of their ailments. The more marked the strumous diathesis, the more true is this observation.

A scrofulous gland may show no symptoms of its distress in

pain, or heat, or other signs of inflammation. A lump or tumor of considerable size is often the first intimation of glandular disturbance. This insidious history is not characteristic of acute non-specific adenitis. In this variety of glandular inflammation, no sooner does the gland begin to swell than it becomes tender and sensitive to the touch. In many cases there is some febrile disturbance and there may be headache and vomiting. The gland itself does not usually become red and inflamed on the surface until some days, or even weeks, have passed. Besides being tender and sensitive to pressure, it gives rise to but little inconvenience. It is very subject to exacerbation, one day being larger and more tender, and the next day, perhaps, behaving as if resolution were progressing rapidly. The formation of pus, if it takes place at all, does so very slowly, and may threaten many times before all hope need be abandoned of its prevention.

Sometimes a single gland or a whole string of glands may be affected at once; or a number of neighboring glands may be simultaneously involved, and the whole number be matted together in a common swelling. When inflammation succeeds to engorgement, it is always of low grade and the formation of pus is not accompanied by any of those symptoms which ordinarily attend suppuration. It is for this reason that the older writers referred to a suppurating gland as a "cold abscess." After an indolent and chronic career of weeks, or sometimes months, the affected glands either slowly undergo resolution and disappear, or become acutely inflamed and suppurate. In some cases the adenitis may be of only short duration, lasting but a few days; but the tendency is as stated above, and the average duration is weeks rather than days.

The tendency to adenoid inflammation is sometimes met with in adults, usually males, and may, therefore, be of lifelong duration; but as a rule, it rarely persists after puberty. When occurring in delicate children in early life, it is reasonably safe to expect that, with better health and the progress of adolescence, the glands will be less sensitive and less liable to acute inflammation.

Treatment.—While the affection here described is manifestly not due to scrofulous or other constitutional taint in the blood, it is usually if not always associated with more or less general derangement of the system. It occurs most frequently in children whose digestive organs are easily disturbed, and who, from too rigid confinement indoors or from constitutional delicacy, are very subject to colds. Glandular inflammation, too, is frequently commingled with some other disease, as scarlet fever, measles, diphtheria or other affections of the throat.

In such cases, it is to be regarded as a complication and treated as such.

When occurring idiopathically or in connection with an ordinary cold, the treatment should be more hygienic than medicinal. Cool sponge baths, frequently repeated, are very useful. These children do not bear confinement indoors, either in school, or in "apartments," which are now so fashionable. They should be out of doors as much possible, and be fed on coarse but wholesome food. If there is such a thing as "hardening" delicate children by exposure to the vicissitudes of the weather, it should be judiciously tried in cases of this kind. Coddling only makes matters worse. Exercise, either active or passive; a due regard for diet; and plenty of fresh air are alone sufficient, in many cases, to overcome the tendency to glandular stenosis and consequent inflammation. When the glands do become swollen and inflamed, they should be rubbed with some warm unguent, like vaselin or camphorated oil. Even gentle friction with the hand, continued for some minutes and frequently repeated, will be found serviceable.

There need be felt no fear of "scattering" the disease. Such a thing is impossible. There is no more danger of such a result than there is of scattering a mastitis, for the two affections are very similar in causation and course.

Indeed, the medicinal treatment is very similar. In both, the first remedy to be thought of, after *aconite*, for the attendant fever, is *hepar sulphur*. In cases of chronic character, with little or febrile accompaniment, hepar, given three or four times a day, will often bring about resolution in a very short time. As the subjects of adenitis are usually small eaters, and of low vitality, we are in the habit of giving them, by way of a tonic, and in the absence of more clearly indicated homeopathic remedies, *chin. arseniate* 3x, a two-grain powder three times daily, half an hour before eating. This remedy is a splendid appetizer and increases the *vis medicatrix naturæ*. Other remedies of value are, *mercurius*, *apocynum*, *phytolacca*, *thuja*, and *sulphur*. The glands themselves should never be poulticed, or swaddled, or opened with a lance, until there are unmistakable signs of pus within or about the glandular structure.

PART XI.

AFFECTIONS OF THE NERVOUS SYSTEM.

CHAPTER I.

INTRODUCTION.

DISEASES of the nervous system, especially functional, and often organic, might be prevented by judicious advice on the part of the physician, followed by proper care on the part of parents.

As to attention to clothing, diet and ordinary sanitary methods, much has been written and taught. Physicians are well qualified to, and do advise in these matters.

We are not, however, doing our whole duty or fulfilling our responsibility, if we neglect to make any effort to guide parents in the training of their children in all respects. We are apt to feel that we have nothing to do with the moral health, with the temperament, with the discipline, or in fact with anything that is not actual sickness, actual disease. It is true, however, that the highest, the grandest function of the physician is to preserve health and to prevent sickness. There is no doubt that in these days very much can be done as regards the special class of diseases with which we are dealing.

The time to commence the prophylactic treatment is soon after birth. First, teach the babe regularity of habits, as to eating and sleeping; in this you lay a foundation for self-control. As the baby grows there should, at all times, be gentle but firm control exercised, insistence on method and order in its little life.

Through childhood order, method, self-control, thought and care as to the comfort and feelings of others, combined with a just regard for, and insistence on, self-comfort and rights, should be taught. No one can control him or herself that has not learned to obey those having a right to command.

The mental development should always be under the general supervision of a competent medical man. The hereditary tendencies, mental and physical, must be carefully considered, and the teaching of the child regulated accordingly. The child of

slow, steady nature, with no predisposition to disease, ought to be encouraged in its natural efforts at learning from the very beginning of mental activity. On the other hand, the child who is at all predisposed to tuberculosis or struma of any kind, or shows the tendency to be nervous, should not be encouraged in learning. The child that is particularly bright and learns readily, remembers well, shows at an early age reasoning powers, must be discouraged in learning. With this class of children, parents are apt to claim that they cannot prevent it. The facts are that they and their friends, by oft-repeated commendation and praise, stimulate the pride of the child, and in this way encourage when they think they are trying to discourage. It is very natural to be proud of one's own child, but the wise doctor will show the parent the danger, and the wise parent will heed the warning.

From birth to puberty develop the physical, and you will be able to develop the mental later. The child that commences school life at nine years of age will, at twelve, usually be on a par in classes with those who commence at six or seven. The comprehension of all that is taught, instead of simply using memory, is a sufficient explanation. The physician should see that the child, male or female, is early carefully guarded against pernicious sexual teaching, either by nurses or companions. The false ideas and the wrong hesitancy on the part of parents to talk with their children on these matters, renders it imperative that the doctor should see that it is not neglected. The natural feeling that "My child could not and would not do anything of this kind," makes the duty of the medical man, whose experience shows him that no class escapes, absolute in his insistence on watching carefully, as to the sexual habits of children.

Be sure the baby, and as it grows older, the child, is always well and regularly nourished, and has plenty of outdoor exercise. Do not allow too much clothing, nor allow a child to be too thinly clad. See that houses where there are children are not made furnaces to reduce the natural resistance.

GENERAL REMARKS AS TO THE DIAGNOSIS OF NERVOUS DISEASES.

Careful work, with close attention to minutia, is the only road to success in diagnosticating this class of diseases. In a very large percentage of the cases, the diagnosis must be made by exclusion. Make in every case a careful, written history. First, as to any possible family taint in any branch of the ancestry, including dissipation of any kind. Second, as to any-

thing of an emotional or physical nature occurring during life *in utero*. Third, as to the character of labor, whether any occurrence that might produce injury, rendering the child susceptible to nerve troubles. Fourth, follow carefully and minutely the life of the babe as to nutrition, sleep and regularity of function; the kind of care and discipline it has had. Fifth, as to each attack of sickness, severity, duration, exact character, and the recovery from each, whether complete and speedy, or tardy, and followed by sequela. Sixth, as to any injury, getting all the particulars as to how injured; the immediate effects, and possible later results. Seventh, as to the very first signs of the trouble for which you are consulted, following it step by step very carefully to the present time.

Having completed the history, make a careful physical examination of the entire body; note the general appearance, the facial expression, the contour of the head, the appearance of the eyes, as to size, shape, concordance of the pupils, and test the vision (if the child is old enough). Examine the nasal passages and the throat; auscultate and percuss the chest and abdomen carefully; inspect the spinal column to determine as to any curvature and as to tenderness over the spinous processes; examine closely the sexual organs for any signs of irritation, for elongated or adherent prepuce, or an adherent clitoris. Note the plumpness of the legs as compared with the upper portion of the body. Test for the reflexes, both superficial and deep. Examine the anus, and if there is any evidence of disturbance of the bowels in the history, or any signs of irritation about the anus, examine the rectum; this is often essential, even in very small children. An analysis of the urine ought to be made in every case. For this purpose, the entire quantity for twenty-four hours should be collected. There is much to be learned, regarding the nerve condition, from a complete quantitative analysis of the urine, and, not infrequently, knowledge that will lead directly to the therapeutic and hygienic measures essential to the speedy cure of the case. For special instruction as to this part, you are referred to Part VIII.

There are many things rendering the examination of children much more difficult than of adults. They are, as a rule, much more emotional; are unable to give us clear and comprehensive descriptions of their feelings; they do not locate sensations as well, and are inclined to exaggerations of expression. Objective symptoms have to be relied on to a great degree. Long experience and habits of close observation alone can enable the physician to approximate in each case the value of expressions of pain, or emotional disturbance.

Marked irregularity in the shape of the head, or great disproportion between the size of the head and of the body in a child, should always be carefully considered with relation to what may be indicated as to the future growth and development, mentally and physically, as well as in relation to their significance in pointing to a predisposition to certain diseases.

There are some special symptoms which it is important to note. Strabismus may be temporary or permanent. It is frequently found in convulsive attacks of every variety; if lasting during the attack only, or a very short time after, it is probably simply functional. If, however, it persists for days, a careful study should be made as to whether there is any abnormal condition in the eye itself sufficient to cause it; if not, examine as to collateral symptoms pointing to disease of the brain.

Nystagmus may be found as a local chorea, or as a symptom of congenital cataract. It is usually a result of cerebral disorder, such as tumor, atrophy, edema, or chronic hydrocephalus. It is nearly always present in the second and third stages of tubercular meningitis.

The pupils, if of unequal size in a child with normal eyes when in health, is a very grave sign in any of the acute cerebral disorders. If they respond to light sluggishly, the indication is bad. Impairment or loss of sight is most common in cases of thrombus of the cerebral sinuses, in meningitis and intracranial growths.

Delirium in a child is usually indicative of some present or approaching febrile disturbance, or of digestive disorder; but is not frequent with cerebral disease, unless of an acute inflammatory nature.

Drowsiness may be marked in cases of uremia, or of digestive disturbance; is very frequently found to be the result of selfishness on the part of the nurse or mother, shown by their administering some of the various soothing medicines rather than be bothered with the child. After a convulsive attack, drowsiness for an hour or two is quite common, and is simply the result of a natural reaction from the excessive muscular exertion and the disturbance of circulation. If, however, the drowsiness is long persistent, evidences of cerebral disease should be looked for carefully. Convulsions occurring frequently, with marked drowsiness during nearly or all of the interval, especially if indications of head pain be present, is likely to indicate meningitis.

Paralysis may be the result of the pressure of forceps in the delivery, of rheumatic inflammation of the sheath of a nerve, of lowered general nutrition, of great prostration, or of cerebral, spinal, or peripheral nerve disease. It may follow convul-

sive attacks; if transitory, is of no special significance, but if it lasts a number of days there probably is some intracranial lesion present.

Rigidity may be (especially in children over six years of age) hysterical, the result of some reflex irritation, or of some spinal or cerebral disease, acute or chronic. A long continued paralysis is quite certain to be followed or accompanied by a permanent rigidity and contraction. The rigidity of the muscles of the neck, drawing the head back between the shoulders, so frequent a symptom in various forms of meningitis, if at all well marked, is a very serious indication.

CHAPTER II.

CONVULSIONS IN CHILDREN.

CONVULSIONS may occur at any age. In fetal life they are not common, but it is probable that they are the cause sometimes of death *in utero*. Attacks during the first week or two following birth are probably the result of injury to the brain by pressure during labor, whether it be natural or instrumental, or of uremia in the mother. They are frequent during the first two years of life, and from this time on grow less frequent to old age. They are, I believe, always the result of irritation of some portion of the central nervous system. Many theories have been advanced and experiments made to determine an exact center, and the definite character of the nerve action; but up to this time with indifferent success. The disturbance of the animal electrical poise, anemia of the brain, explosion of nerve force, vaso-motor irritation or paresis, defective cerebral nutrition from any cause, have all been advocated by men of large learning and special skill in this particular line of study. There is one point on which I think all can agree, *viz.:* that by some as yet undetermined process the inhibitory powers of the higher cerebral functions are interfered with, and as a result of this loss of control, motor, sensory, and vaso-motor centers act without coördination, producing violent, irregular contractions of muscles, occurring in paroxysms, often with insensibility.

There is in these cases a predisposition to convulsions, a neuropathic temperament. It is claimed by many authorities that rachitis is the most common cause. My own experience will hardly justify such a conclusion. Rachitic children are quite liable to attacks, and a large majority do have convulsions; but I have seen many more cases where various stomachic and intestinal irritations are the undoubted cause. Worms, chiefly lumbrici — tape worms being very uncommon in young children — and thread or pin worms, are a frequent cause. Articles of diet that are particularly indigestible or irritating to the gastro-intestinal mucous membrane, or more or less completely impacted fecal matter, may also produce convulsions. Irritation of the genito-urinary organs, various states of the blood, as uremia, and as found at the beginning of many febrile attacks, and passive congestion of the brain,

are common etiological factors. It is now claimed that active arterial congestion is never the cause of convulsive attacks. General exhaustion from any cause, a profuse and lasting diarrhea, are possibly the most common causes, as are also sudden and violent emotions. The hydrocephaloid condition and external irritants to any part of the body, and lowered nutrition, from whatever cause, will render the child additionally susceptible.

The cases due to intracranial lesions, which may occur at any age, may be considered under their respective headings.

It is not at all uncommon for the parents to declare that the first attack came on without any previous indication or immediate cause whatever. By careful inquiry, the physician will nearly always find that for some hours or days, possibly weeks, the child has been unusually nervous and irritable, or it may have been uncommonly quiet and inclined to languor. Possibly little twitchings of the various muscles of the face, hands, or lower extremities were present. In some cases slight spasms of a local character have occurred a number of times. I believe in very nearly all cases you will be able to learn of a more or less marked deviation from the ordinary characteristics of the child. In the cases due to gastro-intestinal irritation from overloading the stomach, or from improper food, there will not usually be marked pain in the stomach or bowels. If the irritation vents itself in local pain there is not likely also to be reflex irritation.

The attack itself is likely to be first a paleness of the face, a rolling of the eyeballs upward, outward, inward, or downward, followed by a stiffening of the body in tonic spasm. There may be opisthotonos or simple retraction of the head, or rolling of the head to one or the other side; hands may be clinched or opened widely, feet straightened out or drawn to the right or left side. This will be accompanied by a flushing of the face, changing to a bluish or purplish hue; more or less difficulty of respiration. Following there may be a relaxation of the contractions, or clonic spasms continuing for a short period, then gradually growing less pronounced until perfect relaxation, and followed, usually, by a sleep of varying duration; preceding the sleep there is a return of natural color to the face and one or more long, deep inspirations. All cases do not present this entire picture; there may be anything from the simple rolling of the eye to the full attack. When the child awakens, it often appears to be perfectly well; but when the attack is due to any immediate and temporary irritation, there will still be found present some evidences of such cause.

It will not always be possible to determine at once whether

there is present a true epilepsy, some organic brain lesion, the ushering in of some acute disease, the result of some constantly acting irritant, or an immediate and temporary irritation. Differentiation from true epilepsy is impossible when occurring in a very young child, or if this is the first attack. In a child not over two years of age, who is thoroughly well nourished, quite fat and robust, it is almost certainly reflex. On the contrary, if emaciated and poorly nourished, a tubercular condition may be suspected. If a brain lesion be present, the convulsion is apt to be partial; one arm or one leg only being affected, often a paralysis of facial muscles, remaining a short time, producing ptosis, drawing of the mouth, inequality of the pupils, or a general paralysis persisting for many hours or days. A strabismus, although not necessarily indicative, yet if at all persistent, not having been present before the convulsion, deserves careful attention as to collateral evidences of brain lesion. If there be no loss of consciousness, and stupor or great drowsiness remains many hours or days, especially if accompanied by muscular contractions, there is good reason to fear intracranial lesion. It is not common to have a convulsion occur as one of the first evidences of an acute disease, yet some children are so susceptible to slight irritations that an attack seems to replace the chill which so frequently ushers in the disease; in these cases, the evidences of febrile disturbance, and the immediate subsequent history, will solve the problem. Much more frequently we have convulsions in the late stages of acute diseases; they are then always of serious import. If the gums are hard, inflamed and swollen, and there is some febrile disturbance, it is probably due to dental irritation.

If there is any discoverable irritation, it is reasonable to conclude that it is a case of eclampsia. Always examine the urine. Children very often have uremic convulsions.

The prognosis in all but the purely eclamptic or reflex cases will be considered in other connections. In those of reflex origin, it depends upon the possibility or probability of removing the cause. If the fit be very severe and of long duration, there is danger that emboli, thrombus, congestion, or effusion may occur as a result of the convulsion. In babes of a few weeks this is very likely to occur, death ensuing apparently as a direct result of the convulsion. If the patient is very much exhausted from acute disease, or very poorly nourished from any cause, a fatal result, while not inevitable, is to be feared. If a convulsion, or series of them, occur in a later stage of any of the acute febrile diseases, death is very probable. Marked stertorous breathing, rapid pulse, or a very pale, livid countenance indicates danger. If there be very scant excretion of urine,

there is serious danger, unless a copious flow of urine of good quality in a reasonably short time can be excited.

In considering the prognosis of convulsive seizures, it must be remembered that many cases of imbecility from arrested cerebral development are due to convulsions, in which we are unable to find any brain lesion. In ordinary attacks the result of reflex irritation, or in rickety children, no such result is to be expected, unless the attacks are not only very frequent, but of long duration, and followed by marked muscular weakness, paresis, or long-continued coma or somnolence, showing immediate cerebral affection as a consequence of the fit.

It is not often that the physician arrives in time to find the patient actually in the fit. When he does, the most important thing is to preserve a calm, well-poised demeanor, and without unseemly haste direct the various persons about, to prepare a warm bath, to undress the child, procure cold water, blankets, towels, etc. It is not a very difficult matter usually to give each person present something to do, and in this way it is quite possible in most cases to secure a quiet atmosphere about the patient, the physician himself keeping a careful, observant eye on the patient, watching the exact character of the fit with reference to the presence or absence of marked indications of cerebral lesion. If the fit has not ceased by the time the bath is prepared, immerse the body from the neck down in the warm or hot bath, and apply cold water to the head. The water should be quite warm, almost hot, but be careful that it is not hot enough to scald. I do not give exact temperature, as it is unnecessary. Nearly always the attack will cease in a very few minutes. Ordinarily, the child may be left in the bath ten or fifteen minutes, but if very much exhausted from previous sickness, or very poorly nourished, not more than from two to five minutes. These baths may be repeated at frequent intervals, if found necessary. The bowels should always be completely emptied with an enema; and if soon after eating, empty the stomach by an emetic. When taken out of the bath, the child should be wiped dry quickly, placed in bed and covered carefully, in a room well ventilated and not too light. If the child is of teething age, examine the gums carefully, and lance them if swollen and tense; in short, see that all immediate irritation is removed.

A dose of castor oil will clear up a case very speedily, if large and small intestines are loaded with any irritating accummulation. It will sometimes be found necessary to administer chloroform by inhalation, in order to stop the convulsions, or to prevent immediate and frequent recurrence. It often

happens that the immediate irritant cannot be speedily removed, and there is danger of serious trouble ensuing from the frequency and severity of the convulsive attacks; in these cases, I advise the giving of a mixture of *sodium bromid* and *chloral hydrate*. The formula is:

Sodium bromid.....grs. 40
Chloral hydrate.....grs. 16
Aqua distil.....q. s. ℥iv.
M.
Sig.: Give a tablespoonful once every hour or two, till relieved.

The remedies to be used at this time are, *aconite*, *calcarea carb.*, *camphormono-bromate*, *gelsemium*, *santonin*, or *veratrum viride*. The physician having the family in charge does not do his duty if he fails, in every case to which he is called, to make careful inquiry and examination for the cause of the particular attack, and as to whether or not there have been previous attacks.

The treatment of recurring cases will be considered in connection with epilepsy.

EPILEPSY.

Epilepsy is a condition of more or less marked loss of consciousness, recurring at regular or irregular intervals, with or without convulsions, not caused by immediate irritation, and where the pathological condition producing the attacks is unknown.

This definition excludes a very large percentage of the cases usually diagnosed as epilepsy. For practical purposes, the only objection to calling all cases of the epileptic class by the one term, is the tendency on the part of the physician to be satisfied with a diagnosis of epilepsy, and to prescribe for all cases their peculiar or special epileptic treatment.

If, by any means, the physician can be induced to consider the attacks simply as symptomatic, and to feel that he has not made a diagnosis of the case until he has ruled out all possible sources of irritation, the prognosis of this disease or condition will be very much brighter, and the percentage of cures can certainly be made much larger than at present. There are many curable cases allowed to go uncured simply because they are called epilepsy and no careful investigation made. If we shall be able to make it plain that a disease, whatever its symptoms, is never correctly named except by its pathology, very much will be gained. Thus, if we have a case presenting the ordinary phenomena of epilepsy, and find that it is due to eye-

strain—a hyperphoria, for instance—the diagnosis should be, not epilepsy, but hyperphoria. I do not claim that the present authorities have been in error in including so many and diverse pathologies under the one head epilepsy, nor do I believe the thoroughly scientific specialist has overlooked the special pathology in his individual cases; but I do believe the general practitioner, whose time is fully occupied, will get much better results by this classification. The prognosis in pure epilepsy depends in the main on the character, frequency and severity of the attacks. Many patients will have quite severe and frequent attacks for many years, with very little apparent effect on the general health, The constant fear of an attack must, of course, have a tendency to mental depression, and so in a measure unfit the subject for the ordinary duties of life. It is true that many epileptics are apparently bright, perfectly able to, and do engage in various vocations, but the frequent recurrence of attacks does, in a very large majority of cases, cause a corresponding loss of mentality. In many subjects there is, accompanying each convulsive attack, an actual insanity, lasting from a few minutes to some hours. There are a few cases in which more or less frequent attacks of acute mania occur at intervals, and are of short duration, the patient apparently being perfectly sound mentally between attacks, and with no loss of consciousness or evidences of spasms; these attacks, although there are no convulsions, must be considered as epilepsy, unless it is possible to discover a sufficient pathology. There is always a liability to idiocy, imbecility, or some form of mental incapacity from defective nutrition of the brain, resulting from the disturbance of circulation. In a small percentage of cases, pathological lesions of various kinds are the direct result of the circulatory disturbance of the brain.

Death as a direct result of epilepsy is not very common, the patient usually dying from some other cause.

Attention should always be called to the danger from accident in falling while in the fit.

The percentage of cures in pure epilepsy, after all the convulsive cases caused by known pathologies are ruled out, under any method of treatment will be small; but I believe under the homeopathic law carefully applied, there is a very decided favorable margin as against the anti-spasmodic methods. In the treatment of recurrent convulsions, the closest attention must be given to every detail in the environment and habits of the patient, and the remedy must be selected with the greatest accuracy.

Where the attacks are the result of any reflex irritation, this must be removed at the earliest possible moment. For in-

stance, many cases resulting from stomach worms have been permanently cured by five-grain doses of *scale pepsin* every two hours. The pepsin should be put in capsules. This dose can be given to children over three years of age, while for younger children the dose should be from two to three grains.

Whenever a source of irritation is found, lose sight of the one symptom, convulsion, and cure the cause, whether it be by the administration of medicine, by operative interference, or by correction of eye condition. The long or adherent prepuce should always be promptly excised, the adherent clitoris liberated, and the constricted urethra or meatus relieved. Do not fail to note and correct any malposition of testicles or ovaries, even in small children. Correct as soon as possible any defect in refraction with glasses, and be very careful to correct fully any muscular deficiency in the eye. While the various heterophorias are not by any means the cause of all cases, they are in a large number, and many can be cured by either the prisms or by operation. Fissures in the rectum and anus are much more common in children than is ordinarily understood, and must be cured at once.

If the child has received an injury at any time, very careful inquiry as to its possible location on the head, and also as to the effects or condition immediately following the injury should be made. The head must be carefully and minutely examined over the entire surface, to ascertain the presence or absence of any evidence pointing to a depression at any point. If there is a clear case of an injury on the head, followed by severe symptoms, such as might be the result of concussion or fracture, and in addition to this there is found at the point of injury a depression, no doubt should be entertained as to the procedure; operate at once. I would like here to caution the physician as to the necessity of examining very carefully for evidences of cranial injury when called to see any child who has had an accident. There are a great many epileptics, as well as mental deformities and insufficiencies, that could have been prevented, had the physician who saw the case, at the time of the accident, given it a proper examination.

If the convulsions are unilateral, or always begin in the same set of muscles, and if they become general; or if the spasm is very much more marked in some one set of muscles; or if a certain set of muscles are paretic or atrophied, or markedly weakened, and it is impossible to find any sufficient source of reflex irritation, the skull should be opened at the center for motion of the affected muscles, and a careful scrutiny made of the outer and inner table of the skull, and of the membranes, and if nothing

be found in these parts, examine deeper in the brain for abnormal conditions.

If there is a history of cerebritis in early life, and a slow mental development, or if the fontanels closed very early, the general contour of the skull should be carefully considered with reference to uneven or irregular development, or an insufficient development and expansion of the cranium, and in the absence of other cause for the attacks, a piece of bone may be removed for the purpose of allowing expansion, and in this way relieve pressure of the brain from a proportionately too small calvaria. The habit of operating, however, except in such cases as indicated, where there are well-marked evidences for the localized lesion, is not to be recommended.

A full quantitative analysis of the twenty-four hours' urine should always be made. A goodly number of cases will be found in which there is a marked deficiency in the excretion of urea. If this low excretion of urea is regular and continuous for some considerable time, and there are no evidences of reflex irritation, it is possibly a chronic uremic poisoning, and must be treated accordingly. In some subjects, there will be found a regular, continuous, low excretion of phosphoric acid, which probably indicates deficient oxidation of phosphorus in the system and may excite sufficient irritation to require special treatment.

In the treatment of epilepsy, and of all recurring convulsions, moral control is of the greatest importance. The child's life should be regulated with the closest attention. Gentle, but firm and regular discipline should be constantly preserved. There must be a preponderance of quiet, and as much freedom from excitement of any kind as possible. The emotional element must not be stimulated; everything that is likely to produce strong emotion of any kind should be avoided and guarded against.

The life should not, however, be idle, but as full of interest in objects outside of the child's own personality as is possible, without in any way straining the nervous forces. It is often very essential that the physician devise ways and means for the amusement and occupation of his patient. If there be any tendency to any form of immorality, the child should be gently led by the strongest influences it is possible to bring to bear, to a right kind of thinking. Every person must be studied as an individual, in order to know just what line of argument or of action will be the most influential, as to just what environments will be most potent for good.

There is no class of cases in which I spend as much time and study in the selection of a remedy as in the pure epilepsies. I

know that if I can find the similimum, there is a reasonable hope of a cure. My method of study is to select some one symptom that is most constant and uniform during the time between the attacks, and also one in immediate connection with the attack. If possible, I find some symptom that is always present, and another that comes with every attack, then look for a remedy or remedies having one or both of these symptoms. I next look for a remedy or remedies covering any dyscrasia, and one covering the general temperament, then for those with like aggravations or ameliorations. I make a list of the remedies so selected, and opposite each one a tally-mark for every symptom common to it and my case. My experience has been that I get good results from the higher potencies in these pure epilepsies more uniformly than from the low. I continue the remedy selected for months, and sometimes for years. In the reflex convulsions I use the lower potencies more frequently than I do the higher.

Never forget, under any circumstances, that any and every possible source of irritation must be removed as soon as possible.

The entire *materia medica* is the list of remedies from which the indicated remedy must be selected. The following are among those possibly most frequently found to be indicated: *Absinthium, athusa cyn., agaricus, ammonium carb., amyl nitrite, argentum chl., arsenicum alb., belladonna, bufo, calcarea carb., calcarea phos., camphora, cannabis ind., causticum, cedron, chinium ars., cicuta vir., cimicifuga, cuprum acet., cypripediam, gelsemium, glonoin, hydrocyanic acid, hyoscyamus, hypericum, ignatia, kali brom., kali carb., kali phos., lachesis, magnesia phos., moschus, nitric acid, nux vom., œnanthe croc., platinum, plumbum, silicia, stannum, staphisagria, stramonium, sulphur, viscum alb., veratrum album, veratrum viride*, and the *zincs.*

It would not be right to neglect some attention to the treatment used in other schools of medicine, and to palliative measures.

There are cases in which it seems absolutely necessary to overpower the convulsive attacks, temporarily at least. Permanent cures have resulted from the administration of powerful antispasmodic remedies.

For many years the bromides have been probably the main reliance of the majority of the medical profession. The various bromides are used, the particular one being dependent usually on the individual preference of the physician in attendance. Mixtures of bromid and chloral hydrate are often used. I do not propose here to discuss the bromid treatment. The dose for a child ranges from three to ten grains, repeated from

three to four times a day. It is better to give it in milk or a considerable quantity of water.

Chloral hydrate may be given to children in from two to five grain doses, or a mixture in which each dose shall consist of from five to ten grains of one of the bromides, and from two to five grains of chloral hydrate. Inhalation of amyl nitrite, a few drops on a handkerchief, immediately on the appearance of an aura, will often prevent an attack.

CHAPTER III.

CHOREA (ST. VITUS' DANCE).

Definition.—Chorea is an affection of the nervous system of uncertain origin, affecting, for the most part, children between the ages of six and thirteen, and characterized by erratic, involuntary, and uncontrollable twitchings or jerkings of certain muscles, or groups of muscles, which are, however, as a rule, quiescent during sleep.

It may be partial or general—unilateral or bilateral—affecting only a single group of muscles, or implicating every voluntary muscle in the body.

It may be sub-acute or chronic, but is usually neither painful nor dangerous. The patient is not deprived of either volition or consciousness, nor is the disease attended with fever. The French call it *folie musculaire*, or "insanity of the muscles."

When the spasmodic movements are confined to one side, the affection is called *hemi-chorea;* when paralysis is associated with it, *chorea paralytica;* and when the chorea follows a paralysis, it is called *post-paralytic* chorea. This last is very similar to paralysis agitans.

Etiology.—There is no fixed or universal cause for chorea. In one case the disease may have a central and in another a reflex origin.

It may arise from some organic and incurable disease of the brain or spinal cord, or, on the other hand, it may be caused by a purely functional derangement of some nerve center or peripheral nerve branch. Cases have been recorded, in which an immediate cure was effected by the removal of a tape worm, or the root of a diseased tooth.

The disease is so commonly associated with rheumatism that the latter is, by some authorities, considered an almost necessary concomitant of chorea. It is a well-established fact that chorea, like rheumatism, is most prevalent in the spring, and in damp climates, and that the heart lesions of rheumatism are also observed very commonly in the victims of chorea. But, on the other hand, there is no constancy in the association of the two diseases, and many severe cases of chorea have been observed in which there was neither rheumatic nor cardiac complications.

Girls, whose nervous system is proverbially more impressionable than that of boys, are affected with chorea more often than the latter—the proportion of victims being generally stated as five to two.

In very many instances, fright has been clearly recognized as the exciting cause. Any sudden mental shock or intense emotion may develop an attack, in a previously healthy child of nervous organization.

The inherent power of imitation is held responsible for those occasional epidemics of chorea which have been frequently observed in boarding schools, where a number of impressionable youth are assembled together. No one has observed any special tendency to hereditary transmission of the disease.

In many cases, the affection so closely resembles hysteria as to be indistinguishable from it.

Among the predisposing causes of chorea are scarlet fever, measles, and diphtheria; indeed, any disease which lowers the tone of the system, may lead up to an attack of chorea. Girls affected with chlorosis, anemia, dysmenorrhea, or amenorrhea, are very prone to this affection. Overstudy, bad air, bad food, anything, in fact, which interferes with full nutrition, and a perfect state of general health, may be regarded as a cause—near or remote—of this perverted condition of the nervous system.

Dr. Worcester states that an investigation in regard to its occurrence among school children, showed that over twenty per cent. of the young children in the public schools of New York are troubled with choreic affections of greater or less gravity. These varied from slight movements of the hands and twitching of the facial muscles to such as attracted the notice of visitors. In some cases the disturbance of the nervous system which causes the outbreak, is not of a mental, but of a reflex nature, owing to some peripheral irritation spreading to the nerve centers.

The fact that girls are more often affected just prior to puberty, or at the time when the organism is undergoing those preparative changes which precede menstruation, is strongly indicative of the reflex character of the exciting cause, and places the affection in the category of reflex neurosis.

Pathology.—From what has already been said, it is apparent that chorea is rather a symptom than a disease *per se;* the irregular and erratic explosions of nerve force which characterize its manifestations may depend upon organic changes in the corpus striatum and thalamus, or to hyperemia or anemia of nerve centers; or, as maintained by some, the disturbance may be due to capillary embolisms. All of these hypotheses

have been discussed, and in the few fatal cases which have been investigated, all of them have been found partial verifications. But in spite of this, and after all is said, chorea has no morbid anatomy; "there is no one lesion of constant standing, save the fungi of vegetations which occupy the edges of the aortic and mitral valves; but endocarditis, in the form of vegetations, is present in the greater number of cases."

Goodhart states that, "Of the fatal cases already recorded (thirty in all), these were present in twenty-eight, doubtful in one, and absent certainly only once. Their absence is quite the exception. The mitral was affected alone fifteen times; both aortic and mitral valves, nine times; the aortic valves alone four times; and pericarditis occurred with the endocarditis six times.

"The constancy of these little growths upon the edges of the valves has led to a very direct, simple, and fascinating pathology for chorea, in the suggestion that it is due to embolism. The vegetations are, it is supposed, washed off the valves and carried into the smaller branches of the cerebral arteries, and thus produce local anemia, malnutrition, and degeneration of the cerebral cortex and ganglia, which lead to the loss of control over the muscles."

This view of the pathology of chorea, while ingenious and probably true of many fatal cases, fails to explain that larger class of non-fatal cases in which the affection is confined to a small group of muscles, and is not only trifling in extent, but of limited duration.

In some of the recorded cases in which these vegetations were noticed, there was no audible heart-murmur during life, nor other indication of valvular disease, which could hardly be the case if this were the true theory of causation. It should be remembered, too, that in these fatal cases, we witness the extreme violence of the choreic manifestations, accompanied with delirium, and other symptoms denoting central ganglionic disturbance—symptoms always absent in those far more numerous cases which, from their comparative mildness and brief duration, have been designated *chorea minor*. The clinical differences between ordinary chorea and the acute and fatal forms, are of themselves suggestive of a different pathology, and the speedy recovery after delivery in the chorea of pregnancy, or (as in several cases on record), after expulsion of intestinal worms, is inconsistent with the existence of embolism. A very important consideration in this connection, is the remarkable limitation of chorea to the period of childhood—the period between infancy and puberty. This is a limitation, as stated by Dr. Broadbent, "if not without parallel, certainly unequalled,

and it points to a condition of nerve centers in childhood which specially favors the occurrence of the disease. This condition may be said with confidence to be the fact that childhood is the period of special activity of the sensori-motor ganglia."

There seems to be a pretty general agreement that the corpora striata are involved in the disease, but there are many, among whom are Dickinson, Ross, Meynert, and Hughlings–Jackson, who doubt whether chorea is due to any special disease of the spinal cord or other part of the nervous system, but think that it, like epilepsy, is due to a disturbance of the whole of the centers. Dr. Henry P. Stearns, superintendent of the Hartford Retreat, says that the primary condition is one of *instability of nerve function.* Such a change has occurred in the elemental tissue of the nerve as to injure its power of activity so far as it is under the control of the will. The nerve has been stimulated to over-activity, or its energy impaired by other causes arising within the system itself. Dr. Hughlings–Jackson expresses the same idea, when he says that the "centers are diseased when half educated," and that the symptoms are due to "under nutrition" of the tissues affected.

Symptoms and Course.—The definition of Dr. Sturges, that "Chorea consists in an exaggerated fidgetiness," will serve to emphasize the fact that chorea is a disease of varied degree. In slight cases, the affection may amount to no more than an involuntary but constant winking of one or both eyelids, or the twitching of one corner of the mouth. But in severe or well-marked cases, the child lies extended in bed, making all sorts of grimaces, with its arms stretched out on the countepane, its fingers pointing in all directions but the natural one, and the forearms and arms so rotated inwards as to make the palms look outwards. In mild cases, the child may be perfectly quiet when lying down, and for a short time even when sitting or standing, if not conscious of being observed; but when walking or while under examination, there will be various fidgety actions, such as abrupt flexion of the fingers, a sudden pronation of the forearm, or hitching up one shoulder; or there is a shuffling of a foot on the floor, a jerk of the head or twitch of the mouth or eyelids. If the patient is told to do anything, the movements are multiplied in the muscles employed and the actions are uncertain and erratic.

An object will be picked up and held, but the hand is brought down upon it hastily and after various random excursions. In the severest cases, the contortions, grimaces and jerkings are incessant.

In walking, the gait is slow, shuffling, and uneven, the steps

of unequal length and time, so that the line of progress is deviating. In these severest cases, every muscle in the body appears to be thrown in turn into violent contraction; the face undergoes the most grotesque contortions, the eyes roll to and fro, the teeth are snapped or ground together, the whole body writhes, and the limbs are in unceasing motion. The patient cannot put a cup of drink to his mouth, without a great deal of management, and is apt to spill it all over himself or his neighbor; mastication becomes difficult or impossible, and the first act of deglutition is impeded.

There is, generally, muscular rest during sleep, but this is by no means constant. In many cases, there is great difficulty in falling asleep, owing to continuance of the muscular spasms, and sleep, when secured, is not profound, but broken by dreams and moans.

On awaking in the morning, there is at first muscular rest, but the spasm soon commences, especially on rising and attempting to dress.

The vocal cords and muscles of the larynx may be affected, and as a result, there is a *quasi* aphonia, so that the speech is husky and subdued. In other cases, the voice is shrill and squeaky. Speech is nearly always modified. The incoördination of the lips and tongue make it difficult to articulate, which is quite distressing to both the speaker and the listener, the words being "snapped" and cut short. In some cases, speech is quite unintelligible. The patient begins a sentence, but cannot finish it because his tongue is in the way; sometimes he is only able to pronounce one syllable at a time. When asked to show the tongue, it is thrust out suddenly and as suddenly retracted. This sudden protrusion and withdrawal of the tongue, called the "choreic thrust," is almost diagnostic of the disorder. In the majority of cases, voluntary motion is not entirely abolished, but only impeded by a failure of the coördinating power.

Although the involuntary movements may be incessant, the patient, nevertheless, succeeds in executing voluntary movements. It is true that he performs them in an awkward, clumsy, imperfect and roundabout way; the intended movement is commenced, but is interrupted by twitchings before it can be executed. The patient then begins to maneuver and succeeds after a time in accomplishing his purpose; but at other times, the effect of exerting the will seems to be an increase of the spasm, which, from having been limited to the face and hands, may then involve the whole body. Any effort on the part of the patient to subdue the spasm and to keep his face and limbs quiet, is often sufficient to increase the vio-

lence of the twitches. It is to be remarked that even in extreme cases, the movements, violent as they may be, are in some degree circumscribed; the arms, for example, are not thrown up over the head, nor do the legs go to the full extent of their range of motion. The tongue is rarely bitten, although the lips may be.

Chorea is generally gradual in its access, even in those cases which eventually become severe. It is very commonly one-sided for a time, and occasionally so throughout (hemichorea). In nearly all cases, the abnormal movements are more pronounced on one side than the other, and this is generally the left. Mental disturbances are rarely absent, and become more developed the longer the disease continues. Most patients are extremely irritable; good-natured persons become passionate; the peaceable quarrelsome; the intelligent appear childish and simple; the countenance becomes dull and stupid; there is marked inattention, and the memory is impaired. Some patients are shy and timid; all are more or less silly. In some cases this amounts to imbecility. These symptoms are not only observed toward the end of a prolonged attack, but are often present at an early period of the complaint, especially when there are tendencies to or complications with hysteria. These aberrations of mind are not, however, likely to be permanent, but pass away as recovery in general takes place.

Complications. — We have already spoken of the fact that rheumatism is by some good authorities regarded as a factor in producing the phenomena of chorea. However this may be, the fact stands that the two diseases are frequently associated more or less directly, and that rheumatism may not seldom be regarded in the light of at least a complication. Thus, Goodhart has compiled a list of one hundred and forty-one cases, of which number thirty-nine had had rheumatic fever, and fifty more had a history of rheumatism in some of their near relatives. His conclusion regarding the association of the two diseases is as follows: "After having gone carefully into the question, I believe some thirty per cent. of families, taken indiscriminately, are rheumatic, while for chorea the percentage is about sixty." There is in some cases such an impairment of motor power in the voluntary muscles as to amount to complete paralysis. Chorea sometimes succeeds hemiplegia in the paralyzed parts; more rarely chorea deepens into paralysis. Cases again are met with, in which with facial hemiplegia there is chorea of the limbs of the same side.

In the violent and fatal forms of chorea there is almost always delirium. Impairment of sensation is not uncommon, and hemi-anesthesia is almost always associated with hemichorea.

Hysteria, more or less pronounced, is quite commonly associated with chorea. We have already spoken of the frequency with which the heart is involved in even mild cases of the malady. In all cases, even the mildest, the heart should receive proper attention.

Prognosis.—There is nearly always—always in cases of peripheral origin—a tendency to spontaneous recovery.

The disease is rarely fatal in children, and when it is so, the case is acute and violent from a very early period of the attack; and it is rare for the malady to run its usual course, and then take on a very serious character. Relapses are very common, and the oftener they occur the greater danger there is of the disease becoming chronic and incurable. The average duration of the affection is stated by Broadbent to be about two months. If prolonged beyond the third month, it may be exceedingly chronic, and go on—now better, now worse—for one or two years. When associated with menstrual disorders in girls, or occurring before puberty, the prospects for recovery are better than when associated with acute rheumatism, or after puberty.

Diagnosis.—The only maladies which are at all likely to be mistaken for chorea are paralysis agitans—which rarely affects children—epilepsy, locomotor ataxia, and cerebral and spinal schlerosis. A brief study of these affections will suffice to differentiate them.

Treatment.—The treatment of chorea, to be successful, must take cognizance of the cause and the nature of the ailment as affecting the individual case in hand.

As we have seen, a great variety of causes may operate to produce, in a given case, the symptoms of chorea. Each case must therefore be individualized, and the treatment adapted to its special peculiarities. Where worms are suspected, appropriate remedies should be given for their expulsion. Girls affected with dysmenorrhea or menstrual irregularities, should be given remedies suitable for regulating the menstrual function. In all cases of chorea the nervous system is more or less unstrung, and the system is morbidly impressionable. For this reason the surroundings of the patient should be made favorable to rest of body and mind.

All discussion of the case in the presence of the unfortunate victim should be avoided. The child should be taken out of school and kept out until cured.

Light exercise of a rhythmical character is very beneficial. I once had a case of chorea that was cured by the use of roller skates. Music has great power over these patients, and will often have a most soothing and beneficial effect. Dr. Julia

Holmes Smith relates a case of a ballet dancer, who had perfect control over her limbs when engaged in dancing, but who, after retiring from the stage, would be seized with the most horrible contortions. As both plethoric and anemic children are subject to chorea, the diet should be adapted to the special nutritive needs of the individual. Judicious feeding will be often found a powerful adjunct to medicinal treatment.

In our own experience we have found electricity to be a remedy *par excellence*. We have always used the Faradic current, giving it as strong as could be borne without discomfort. Our method of applying it has been to place one pole (indiscriminately), over the solar plexus, and slowly pass the other up and down the spine, continuing the application for from seven to ten minutes daily.

Massage is another measure which has seemed to be very helpful in many severe cases.

Among the drugs which have been successfully used in the treatment of chorea, *arsenic* stands preëminent. The pathogenesis of arsenic abounds in symptoms simulating all forms of nervous diseases.

Dr. Hammond and other authorities of the Old School give the drug in the form of Fowler's Solution, administering it, by preference, hypodermatically. It may be administered in this manner to a child in doses of from two to five drops, diluted with an equal quantity of *glycerin*. In using the hypodermatic syringe, Hammond says: "The safest location is on the front of the forearm, about midway between the wrist and elbow. Here the skin is loose and can be easily lifted up by the thumb and finger from the tissue below. The arsenic should be deposited just under the skin in the cellular tissue, and not in the substance of the muscle or skin. The point of the syringe should be carried just through the skin and then for half an inch parallel to the face of the arm, and the injection made slowly."

In cases complicated with paralysis, *strychnia* affords an admirable remedy. Dr. Hale says that in these cases, he has found the arsenite of strychnia 2x of decided value. He also gives the following indications for *cuprum*, which he regards highly in certain cases: "The choreic movements are characteristic. They appear to start in the fingers and toes and spread to the muscles of the limbs. The patients are better when lying down, and when asleep, although the sleep is not entirely free from choreic movements. The muscles of the throat are affected, causing dread of suffocation, and difficult deglutition. As taught by Rademacher, under certain circumstances, copper appears to enrich the blood like iron. If your

cases are chlorotic, it is an additional indication for copper. If cuprum fails, try the arsenite of copper, which, in my hands, has cured two cases. Tablets of the 1x or 2x; one after meals, and at bedtime." This same high authority thus speaks of *cimicifuga:* "It is useful both in 'fright chorea' and in many cases of chorea appearing just before or at puberty in girls. Cimicifuga, given freely, will bring on the menses, after which the chorea will improve. It will cure chorea in older girls when it appears only before and during menses. The active principle, *cimicifugin*, sometimes called 'macrotin,' is quite as efficient and more convenient, for a tablet of the 1x, containing one-tenth of a grain, is equal to five drops of the tincture."

Dr. C. L. Gregory, and many other homeopathic physicians, have had good success with *gelsemium*, especially in cases where the heart's action is weakened. Special stress is laid on the importance of administering a good preparation of the green or freshly dried root.

Veratrum viride is recommended highly in cases of chorea, affecting robust girls, having violent attacks, the spasmodic movements varying on tetanus and opisthotonos. The heart's action is very violent, and perhaps spasmodic. (Dose of the tincture, one to five drops every three hours.)

In a discussion before the American Institute of Homeopathy some years ago, Dr. T. F. Allen stated that he valued *cicuta* very highly in chorea, although it was a remedy not often used by others. He gave it in the sixth dilution.

At the same meeting, Dr. Kershaw spoke of having had great success with *valerianate of zinc*, which he administered in the first to the third trituration. He mentioned several cases of severe type which had yielded to this remedy when others had failed.

Tarantula is a remedy which has many advocates, especially in cases that tend to recur or become chronic.

Nux vomica.—This remedy is often required, and is indicated in those cases when the child complains of vague flying pains about the legs and chest; also a twitching of the jaws and upper extremities. Other symptoms are a sense of numbness in the affected muscles; unsteady gait; the feet drag; movements renewed by the least touch, but lessened by steady pressure; impaired appetite; constipation, despondency; all the symptoms worse in the early hours of the morning.

Ignatia is useful when the left side is mainly affected; when the convulsive twitchings are brought on by fright or grief; are worse after eating; sighing and sobbing, and disposition to be alone are also characteristic.

Calcarea carb. is indicated in chorea connected with denti-

tion, or in leuco-phlegmatic patients; also when the disorder is brought on from fright or onanism; there are the usual twitching of the muscles, trembling, and great weariness.

Hyoscyamus and *stramonium* are favorite and often-indicated remedies. In the hyoscyamus case the movements of the head are from side to side; the arms thrown about, the gait tottering, and the patient is talkative and easily excited to laughter. The symptoms calling for stramonium are exceedingly characteristic; the convulsive movements have the feature of affecting the parts of the body crosswise, as, for instance, the left arm and the right leg, while the other limbs are unaffected; or the muscles of the head and neck are violently agitated; or the spasms may involve the whole body, compelling the performance of the most grotesque leaps, motions, and gestures; is full of fears; handles the genital organs; weeps and laughs alternately.

Speaking from our own experience, the remedy which has seemed to be more generally efficacious than any other is the *mono-bromid of camphor* in the 2x or 3x trituration. We recall three cases in which it was the only remedy given, and in which the improvement was immediate and permanent.

In delicate and anemic girls, every means should be employed to enrich the blood and improve the general tone of the system. Cod-liver oil and some preparation of iron are of unquestionable value in such cases. There is a new preparation of cod-liver oil which is quite free from the objectionable taste of the crude oil, and of the various emulsions, and which we have found very beneficial—"Stearn's Wine of Cod-Liver Oil."

This preparation can be given to any one regardless of their antipathies, as the taste and smell of the oil are perfectly disguised.

The moral treatment of these cases must not be forgotten. They must be encouraged and cheered; over-taxation of mind and body must be interdicted; good food and fresh air, with plenty of rest, are essential to their recovery. Dr. Edward Blake, of London, regards stammering as a local chorea, and reports several cures effected by means of labial gymnastics, electricity, and the properly affiliated homeopathic remedy.

Sul. ars. + Kali's

CHAPTER IV.

INFANTILE TETANUS (TRISMUS NASCENTIUM; LOCKJAW).

Definition.—Infantile tetanus is a rare but very fatal form of eclampsia occurring occasionally during the first two weeks of life, and characterized by more or less general tonic contraction of the voluntary muscles; the spasm beginning, as a rule, in the muscles of mastication, from which it extends to those of the trunk and limbs, with irregularly recurring exacerbations of short duration.

Causes.—The causes which have been assigned from time to time for the production of infantile tetanus are very numerous; the latest theory being that it is propagated and disseminated by means of its own peculiar bacillus, and that it is both contagious and infectious. As this view of the subject has as much ground to support it as any which has preceded it, it will doubtless be rigidly maintained until another and more plausible theory supplants it. It is a very rare disease among the upper classes and the well-to-do, and, in our northern climate, is exceedingly rare outside the larger cities. It is more prevalent in the extreme south, and more common among the blacks than whites. Many physicians having a long and extensive practice have probably never seen a case of it; and yet, in some countries, it figures quite formidably in the record of mortuary statistics. Dr. J. Lewis Smith says that in New York City it is more common than tetanus at any other age, or, indeed, in all other ages, "since the mortuary statistics of this city exhibit a larger number of deaths from this disease in the first year of life than subsequently." For the year 1892 the health department reports of Chicago show twenty-five deaths from infantile tetanus to forty deaths from tetanus among adults. Dr. Smith confirms the experience of most other observers who have studied the affection, that tetanus is nearly, if not always, found among the filthy, ill-fed and depraved residents of the slums. It may be said to be always and everywhere associated with dirt and ignorance. Dr. Marion Sims and others have endeavored to prove that one of the most common causes of trismus was displacement of the occipital bone from over-riding; others have attached great importance to the bad condition of the

umbilical cord, which in several instances has been found suppurating, or in a state of inflammation. Without entering into a discussion of the vexed question, it can be safely stated that the cause is not always the same, and that among the most common etiological factors in its production are irritation and inflammation of the umbilical cord, injuries to the head or other portions of the body during birth, circumcision, cold and dampness.

Any or all of these agencies are capable of producing, in a new-born infant, other things being favorable, that train of phenomena which is called tetanus.

Symptoms.—Tetanus neonatorum comes on usually between the third and eighth day after birth, but occasionally not until some days later. Dr. J. L. Smith has tabulated forty cases, in which the youngest case was under two days old, the oldest twelve days, and nine cases were three days old. Niemeyer says—but this is undoubtedly an error—that it never occurs except between the first and fifth day after the fall of the navel string. Restlessness is generally the first noticeable symptom of an attack; the child cries out in its sleep and seems greatly distressed.

It next refuses to be pacified with the breast, or becomes incapable of taking it. The nipple, if seized, cannot be retained, and the milk is regurgitated or dribbles out of the mouth, owing to the difficulty of swallowing. On attempting to insert the finger into the mouth of the patient, we find that the jaws, though not absolutely closed, are more or less fixed. There is rigidity of the masseters, and the disease gradually extends to the other voluntary muscles, so that in the course of a few hours the muscles of the limbs, as well as of the trunk, are involved. The rigidity of the muscles is progressive, and when it has reached its maximum, the jaws are fixed almost immovably, often with a little interspace between them, through which the tongue presses, and in which frothy saliva collects. Stiffening of the cervical muscles draws the head backward and holds it there; the forearms are flexed; the thumbs are drawn across the palms of the hands and are firmly clenched by the fingers; the great toes are adducted, and the other toes flexed. Occasionally opisthotonos results from the extreme contraction of the dorsal and posterior cervical muscles.

Frequent exacerbations occur in the muscular contractions, sometimes without apparent cause, and sometimes produced by anything which excites or disturbs the child. Handling and attempts at feeding provoke renewed paroxysms. During the paroxysms the eyelids are tightly compressed, as well as the lips; the forehead and cheeks are thrown into wrinkles, and the

physiognomy is indicative of great suffering. Breathing is much impeded, and in some cases suspended, so that the child dies of suffocation. In fatal cases, the paroxysms occur more and more frequently until the period of collapse. It is usually difficult, if not impossible, to ascertain the condition of the pupils, owing to the firm compression of the eyelids.

In some cases, strabismus has been noticed. During the stage of collapse the pupils are usually contracted. Death usually supervenes from exhaustion in from a few hours to two or three days.

The mortality is very large. Wallace reports thirty-four cases with twenty-nine deaths; and J. Lewis Smith forty cases, with thirty-two deaths. In some epidemics, and in certain localities, all the cases are fatal.

Treatment.—Nearly everything in the *materia medica* of all schools of medical practice has been tried in these cases; but with very unsatisfactory results. Heroic treatment by means of ice bags, copious sweatings and anesthetics, which has been resorted to in the tetanic convulsions affecting adults, is, of course, not to be thought of in treating the new-born.

The difficulties of treatment are enhanced by the fact that the patient is in most instances unable to swallow, so that the administration of medicine by the mouth is impossible. The hypodermatic syringe, however, enables us to use such drugs as can be employed in a fluid and concentrated form. The drugs which seem to have been most useful are *strychnia*, *gelsemium*, *conium*, *cicuta*, and *passiflora incarnata*. The latter is highly lauded by Drs. Lindsay and Phares, of Louisiana, but it has to be given in large doses—a teaspoonful at frequent intervals. In administering the remedy, care must be taken to procure a fresh preparation, as it is subject to deterioration if kept long.

The main dependence must be in sustaining the strength of the patient, who is not only menaced by suffocation, but starvation. Stimulants and nourishment must be given by forced feeding, or "gavage," as described on page 61, the rubber tube being inserted through the nose, if the mouth is not available. The hot bath, or even the hot pack, may prove serviceable.

CHAPTER V.

PARALYSIS.

THIS symptom may occur in children from the same causes as in adults. If the physician will bear in mind the fact that paralysis is not a disease, but simply a symptom of disease, and that a diagnosis is not made until the disease or lesion, causing this symptom, is discovered, he will save many failures.

CEREBRAL PARALYSIS.—Cerebral paralysis is a loss of voluntary motion from some pathological condition within the cranium; it may be congenital or appear at any age.

There are recorded a large number of cases of cerebral hemorrhage occurring at birth, especially in conjunction with protracted or instrumental labor. In these cases there is usually rapid softening and breaking down of cerebral tissue, not infrequently to an extent which leaves quite large cavities in the brain; they are much more common in the motor tract, than in other parts.

Symptoms.—At the onset of any cerebral paralysis, there are likely to be present concomitant symptoms, due to shock and general molecular change, convulsions, fever, delirium, coma or emesis. Bear in mind that a child is much more susceptible to any impressions on nerve structure than an adult. The location and extent of the convulsion at the onset are of practically no assistance in localization; they may be confined to one member, to one side of the body, or be general, no matter where the lesion is located. Convulsions recurring later may be of the greatest importance in localization. Febrile disturbance is usually of a very mild nature, the temperature rarely going above 101° Fahr.

Delirium is often lacking, and when present is usually mild. Somnolence is usually present, and not infrequently pronounced coma. Emesis, according to my experience, is quite common, but not of a severe character.

The direct symptoms, that is, those dependent, not on shock, but the direct result of the lesion, sometimes termed localizing symptoms, are paralysis, contractures, exaggerated tendon reflexes, mental alienation or impairment, muscular wasting, and impairment of speech and hearing.

The direct symptom, paralysis, may be classed under the four groups, hemiplegia, double or bilateral hemiplegia, or diplegia; paraplegia and monoplegia. Hemiplegia is most common previous to the third year; if the face is involved, which is not very common, it is confined to the parts below the eye. Diplegia is usually congenital, and the result of injury to the brain during labor or to fetal troubles. Paraplegia is most frequently congenital, but occasionally appears in early infancy. Monoplegia is much more frequent after the third year.

Contracture of the paralyzed muscles is almost always present; not a rigid, but a pliable contracture. Light, steady, gentle effort by an attendant will overcome the contracture, but the limb very soon returns to its original position. The joints are usually very pliable, so that the limb can be readily moved in any direction by an attendant.

The tendon reflexes are usually slightly exaggerated.

The mental condition may be anything, from acute mania to a slight aberration, or from a simple arrest of intellection to absolute idiocy.

Muscle wasting is not very pronounced, but is usually present in some degree. It is not an atrophy, but a lack of development as a result of non-use.

Disorders of speech of every shade occur and are very common.

Derangements of hearing are not very common, but occasionally occur.

The electrical reactions are nearly normal.

The affected limb is apt to have a slightly lower temperature and a poor circulation.

Spastic chorea, athetosis, and post-hemiplegic tremor occasionally occur.

Recurrent epileptiform convulsions occur in a large number of the cases. They may be either general, which is most frequent, or they may be well-defined localized convulsions.

Diagnosis.—In making a diagnosis, the history from the onset should be very carefully taken in minute details; not infrequently you will find your only clue to a correct diagnosis in the onset and chronology of the case.

In cerebro-spinal meningitis, sporadic or epidemic, the paralysis is very rarely bilateral. There is a marked tendency to somnolence or coma; there is a high temperature, almost invariably marked retraction of the head, and general indications of severe illness, such as you will very rarely find in the onset of a cerebral paralysis.

In suppurative meningitis, there are marked remissions of symptoms, a fluctuating temperature and pulse, chills, and the

general accompaniments of sepsis, and there will be a discharge of pus from lung, ear, orbit or nasal cavity.

In anterior polyomyelitis the contraction of muscles, excepting in long-standing cases, is absent; the tendon reflex is absent, electrical reaction of the paralyzed muscle is altered, and there is true muscular atrophy of a part or all of the paralyzed muscles.

In transverse myelitis there are rectal and vesical complications.

Prognosis.—The gravity of the condition depends on the extent of the cerebral lesion as shown by the mental condition, the extent and character of the paralysis, the contractures, and the condition of the reflexes.

MULTIPLE CEREBRO-SPINAL SCLEROSIS.—*Synonyms:* Disseminated Sclerosis, Insular Sclerosis, Focal Sclerosis, Charcot's Sclerosis. The sclerotic patches may be in the brain, in the spinal cord, or, as is most frequently the case, in both. The condition is very uncommon in children, but occurs with sufficient frequency to warrant a description.

Symptoms.—According to Charcot, there are two modes of onset: one is sudden; the tremor, weakness and ataxy date from convulsion or an apoplectiform seizure. In the other form the onset is slow and insidious; vertigo, headache, vague muscular weakness, with incoördination and tremor, are the symptoms first noted. In both modes of onset, occular symptoms, such as third and sixth nerve paresis, optic nerve atrophy, and nystagmus, defects of articular speech, mental weakness, sensory disturbances, and contractures occur to complete the diagnosis.

In childhood, the first form, or the sudden onset, is much the more common. Tremor is always present in cases in children. It may be general, even involving the head, bilateral or unilateral. It is a pronounced, coarse tremor, and is intensified by voluntary muscular exertion. Ataxy of various degrees and forms will be observed in the progress of every case. It may be in the upper extremities, shown by an inability to carry food to the mouth, or an inability to control the hand in writing or other movements requiring fine coördination, and is not due to tremor or paralysis. The gait may be staggering or like that in posterior spinal sclerosis, or there may be a certain rigidity of gait, combined with an inability to place the foot where it is desired, except by the aid of vision.

Very early there is likely to be transient strabismus, dilatation of the pupils, drooping of the lids; later, in many cases, there will be found optic nerve atrophy. Nystagmus occurs in

about half of the cases. It may be noticed only on horizontal or lateral movements of the eye, under excitement, at irregular intervals, or constantly.

Probably the most common disorder of speech is a slow articulation, each syllable and word being separate, a true scanning speech; there may be more or less marked tremor in speaking, and any grade of indistinctness, from a simple, thick articulation to absolute unintelligibility.

The intellect is usually much impaired and not infrequently there is absolute dementia.

Very early in the case there is usually a peculiarly sharp, circumscribed, neuralgic headache; most frequently frontal. More or less headache is often a very persistent symptom. Vertigo is quite common.

Early in the attack, paralysis of the third or sixth nerve, or of both, is quite common. As the case progresses, the facial muscles, and those of the tongue, lips, and pharynx are occasionally paralyzed. The extremities are usually paralyzed in the later stages.

The superficial reflexes are not usually affected, except in the late stage of the disease. The knee jerk is apt to be exaggerated early. In a few cases where the posterior column is especially involved, the knee jerk may be diminished or absent.

Causes.—In regard to the causes of this disease, in by far the larger number, none can be determined. There is no doubt that heredity is an important element in starting the child with a predisposition to nerve trouble. It has followed acute infectious diseases closely enough to be reasonably attributed to them. Injury to brain or spine may be a direct cause. Sudden and severe emotional shock has seemed to be the direct cause in some instances.

Diagnosis.—In children there will never be any difficulty in differentiating, except between it and Friedreich's ataxy. In this disease the tremor is not nearly so common, and when present is never confined to efforts at voluntary motion, and is more like chorea. The nystagmus is only noticed when the eyes are directed to some object. The knee jerk is almost invariably absent or very much reduced; the intellect is rarely affected.

Prognosis.—This disease may be classed among the incurables. The physician sometimes, and the friends usually, will be much encouraged from time to time, because of marked temporary remissions in the symptoms, and on account of days or weeks passing without any noticeable advance. It should not be forgotten that such remissions and times when there is no advancement belong to the regular course of the disease. A few cases

have seemed to be arrested for a term of years, whether due to treatment I cannot say. Death will almost invariably result directly from inability to swallow on account of bulbar paresis, from lung complications on account of enervation of these organs, to inanition, from the loss of trophism, or to some intercurrent trouble.

Treatment.—As to treatment, if a well-defined heredity or acquired syphilitic taint be present *potassium iodide* should always be exhibited. It is my habit to give, if the patient is under fourteen years of age, from three to five-grain doses in four drachms of water four times a day. In all cases where no syphilitic taint can be clearly determined, the careful study for the indicated remedy, and extending through the entire list, is the best that you can do. My own great reliance, and the treatment I use in every case, even in a very small child, is nerve vibration.

CEREBRAL HEMORRHAGE, THROMBUS AND EMBOLISM.

The symptoms and results of these three conditions are so similar that they can be better considered together than separate; the differences essential to correct diagnosis and for treatment must be carefully noted. They are not as frequent in children as in adults, but are very much more frequent than was supposed a few years ago.

CEREBRAL HEMORRHAGE is an extravasation of blood of any amount, from rupture of one or more blood-vessels within the cranium.

Causes.—It may be caused at birth by a long, protracted labor, or by the use of forceps, by traumatism at any time subsequent to birth, by diseased blood-vessels; miliary tubercles are found in a good many cases. Dr. Sachs has called particular attention to a degeneration of blood-vessels apparently peculiar to young people. Anything that causes a very marked increase of the blood pressure, either general or intracranial, such as paroxysms of whooping cough, straining at stool, sudden and violent exercise, sudden and violent emotion, fright, or convulsions may be followed immediately by cerebral hemorrhage. It may be looked for as a possible complication in typhoid fever, scarlet fever, small-pox, diphtheria, rheumatism and acute miliary tuberculosis. In these cases it may follow immediately an initial convulsion, or as is more frequent, appear in the latest stage of the disease. Hereditary or acquired syphilis may be a cause.

THROMBOSIS is an occlusion of one or more of the cerebral vessels from abnormal conditions in the vessels, and the formation of a clot within the vessel or vessels at the point of trouble.

Causes.—This may be caused by hereditary or acquired syphilis, tubercular conditions, or any disease producing degeneration of the blood-vessels. From my own experience and reading, I conclude that this disease is exceedingly rare under twenty-five years of age.

EMBOLISM is a plugging of a cerebral blood-vessel by clot or other substance carried to the point of trouble, by the blood current, from some other part of the body.

Causes.—Such diseases as bronchitis, pneumonia, diphtheria, small-pox, scarlet fever, measles and rheumatism—in short, any disease likely to cause fungus formation on the valves or thrombus in the pulmonary veins—may be fruitful sources of this condition. Hemorrhoids, or wounds in which a clot may form, partly within a blood-vessel, may have a portion of the clot washed into the blood current and carried by it to a cerebral vessel. Embolism is probably more frequent in young children than hemorrhage, and very much more so than thrombus.

Symptoms.—If either of these lesions occur at birth, it will be difficult to establish evidence of life or regular respiration. Nothing further abnormal may be noticed for days or even weeks. A hemiplegia or paraplegia, of either the arms or the legs, or a monoplegia, may appear very soon, or may not be noticed for some weeks. Contractures will appear soon after the paralysis. It is very rare for any convulsive seizures to appear during the first few months.

If the lesion occurs subsequent to birth, it may be during apparent perfect health, or in the course of the diseases mentioned as causes. In nearly every case, there will be loss of consciousness, it may be a simple somnolence, or an absolute coma. There may or may not be a convulsion. In many cases, the head and eyes will be turned in the same direction, and that will be toward the side of the lesion. The face is likely to be purple, congested; the breathing labored and often stertorous. I have had one case, in my experience, in which the face was pale. The temperature will rise to from 102° to 104°, or even to 107° or 108° Fahr. If it goes above 105°, the case is very serious, and death is likely to result. The pulse at first is apt to be increased in frequency, but soon becomes slow and full. Paralysis may be noticed during the coma, or more frequently immediately after the return of consciousness.

If initiated by a convulsion, the convulsive movements may

or may not be confined to the muscles which are subsequently to become paralyzed.

The paralyzed muscles may show slight contractions very soon. Wasting from non-use, and arrest of development, more or less complete in the paralyzed muscles, is always present as the case progresses.

The tendon reflexes will be exaggerated in the paralyzed limbs, the electrical reaction will be unchanged until such time as degeneration of muscle tissue takes place. The reaction of secondary degeneration will not be present even then. Aphasia and mental disturbances are often present. In nearly all these cases, associated movements, athetoid movements, or chorea-form movements, will supervene sooner or later. The paralysis is usually in the form of a hemiplegia. The face may or may not be implicated. There are a few cases in which there is a paraplegia of either the arms or the legs, and occasionally a monoplegia. In nearly all cases, a partial recovery takes place naturally; first the leg, then the arm, and lastly, if affected at all, the face. This recovery continues to some indefinable point and then ceases. The accompanying contractures appear early and are persistent; they are at times so severe as to render the limb entirely useless. The flexor and adductor muscles are more frequently affected than the extensor and abductors. Convulsive seizures are quite common through the balance of life, although there are a goodly number of cases in which they never occur; they may be general, confined to one side, or to a single extremity.

Diagnosis.—The diagnosis of cerebral paralysis is comparatively easy, but the distinction as to the producing lesion requires some special attention. In children the presumption is in favor of meningeal or cortical lesion, as they are far the most common causes of paralysis in children. If the coma be marked and prolonged, and there be convulsions occurring very frequently, it is probably meningeal. If, on the other hand, the coma is very slight, of short duration, and there is but one convulsion, it is probably in the interior of the brain or capsular. Early and marked mental defects point to meningeal or cortical lesion. Hemiplegia without involving the face is cortical. If there be convulsive movements in the paralyzed part, it is probably cortical. Abnormality or irregularity in the shape of the cranium points to cortical lesion. Those cases produced by the diseases mentioned as causative, are likely to be intracranial.

The differentiation between hemorrhage, thrombus and embolism, in a large percentage of the cases, is impossible. If there be present any condition in which an embolus may exist, and the

initial attack is very sudden, and partial recovery very rapid, it is probably embolism. If there is such a condition present as to render probable a degeneration of the blood-vessels, and the attack is not markedly sudden, and the natural recovery slow, it is probably thrombus; all other cases are probably hemorrhage. It is possible that we may have a condition of circumscribed inflammation and destruction of function in small areas of the cortex similar to the condition found in the anterior horns in polyomyelitis. I do not know how to distinguish this from other lesions. In tumor the headache, vertigo, and presence of optic neuritis preceding the attack will enable you to differentiate.

Prognosis.—As to the prognosis in the cases occurring after birth, the more profound and long-lasting the coma, the higher the temperature, the more imminent is a fatal termination. Frequent convulsive attacks are very unfavorable to life. Any sign of returning consciousness is favorable, but never fail to call attention to a possible relapse speedily into as profound a coma as ever. During the coma you may be able to form a very fair idea as to the extent of the probable resultant paralysis. When consciousness is entirely restored, and the temperature normal or nearly so, you can safely predict that the general health will probably be restored. You cannot, however, predict what the mental condition will be; this you can only judge of as the weeks go by. It is safe to call attention to the fact that there may be absolute idiocy; that the mentality may be arrested at this point, that it may be simply retarded in its development, or that it may not be affected at all.

As to the progress of the paralysis, if from a hemorrhage, bear in mind that there is very soon formed a clot, the extent of which is determined by the extent of the paralysis. This clot will soon shrink in size, thus causing an improvement in the extent and completeness of the paralysis; the clot is then encysted and begins to degenerate. The contents of the cyst finally being entirely absorbed, the walls close together and form a cicatrix. During this process gradual improvement in the paralysis will take place. If the contractures are marked and persistent, there is not only pressure, but irritation present, and there is less likelihood of complete recovery.

The cicatrix is often entirely absorbed, so that an autopsy a few years later will fail to reveal any signs of the original hemorrhage.

While in a certain number of cases there is practically a perfect recovery, in many there has been sufficient permanent damage done to the brain tissue to prevent its ever returning to a normal functional activity. In these cases a certain amount

of paralysis, contracture and slowness of development will always exist to the end. Always bear in mind that if the initial attack is indicative of profound cerebral lesion, even if there be comparatively little motor disturbance, that it is possible to have extensive lesion of the occipital or frontal regions without marked paralysis, and in these cases the prognosis respecting the mentality is very unfavorable.

In thrombus, remember a greater or less portion of the brain is cut off from circulation, that there is a tendency to degenerative action, that restoration can only take place through collateral circulation, that therefore the chances of a complete recovery, or of rapid progress, are not nearly so favorable. There is more probability that a secondary softening involving the areas deprived of circulation will occur.

In embolism, remember that there is no pressure, that in a certain number of cases the force of the circulation will break up the plug and carry the particles to destruction, and a complete and early recovery take place; that the blood-vessels and surrounding tissues are, at the onset, in a normal condition, thus allowing opportunity, except in a case of terminal vessels, for free collateral circulation. By this means the area cut off from circulation is soon, to a greater or less degree, restored to nutrition and to functional activity, and the prognosis is rendered proportionately favorable as to rapidity and completeness of recovery. It, however, is never wise in any case to be profuse in promises of recovery; no man knows what change may take place in a day to materially alter the patient's prospects. In the congenital cases the prognosis is always grave, the chances for recovery from the paralysis are very slight, and convulsions are almost certain to be frequent and severe, and the mentality almost certain to be of a very low grade. There are exceptions—that is, a few cases have grown up with fair mentality, and some free from convulsions.

Treatment. — In regard to the treatment of hemorrhage, thrombus or embolism, in the congenital cases, your first efforts will be directed to establishing and maintaining regular respiration; this at first must be accomplished by mechanical means, such as artificial respiration, inflating the lungs with air, and forcing the air out again by compression at regular intervals. After self-respiration has been established, *lachesis* 12x may be of benefit in assisting regularity.

In the cases occurring after birth, the one most important thing for the physician to remember is, that he can easily do too much; the parents and friends are anxious that something be done, and not infrequently has the physician jeopardized the prospect of the patient on account of the importunity of

parents and friends. If the onset is a convulsion, the ordinary rule to put the child in a hot bath is dangerous; therefore study carefully your case when first called to a child in convulsions for the first time. If the temperature is high, make your arrangements for the bath, in this way getting every one about busy, then look carefully for any evidence of the spasm being local instead of general, also for any evidences of paralysis; note carefully the character of the respiration and of the pulse; if satisfied that cerebral hemorrhage or thrombus is present, give *gelsemium* 3x if the child be under one year, or 1x if under three years, and from one to two drop doses of the tincture if over three years of age. *Secale cornutum* may be used in the same doses. Lachesis 12x or *cnprum aceticum* 3x may be indicated. None of these may be indicated; each physician must select for himself the indicated remedy in the individual case. These are the remedies I believe most frequently needed. If unable to control the convulsions with remedies within a reasonable time, *chloroform* by inhalation ought to be used, of course with caution. The mixture of *bromide* and *chloral hydrate*, on page 656, may be, in some persistent cases, advisable, or small doses of chloral hydrate alone may be used. Hot sponging may be of service.

If the onset is with coma, have the child kept very quiet; do not put ice on or about the head, but occasionally tepid body and head sponging should be used, if the temperature does not fall within a few hours. If the rectum is loaded, unload it by enema; *aconite* 3x will, I think, be called for more frequently than any other remedy; never, under any circumstances, give *opium* to a child under seven years of age; if older than seven, *opium* 1x or 3x, *stramonium* 3x, or *nux vomica* 3x. Keep the patient quiet and continue the selected remedy till consciousness is restored; continued or rising temperature is of grave import. Always look carefully after the urinary excretion; if markedly deficient, *helleboris niger* 1x or 3x will probably be the best remedy, although *apis*, *chamomilla*, *apocynum*, *gelsemium*, *sweet spts. nitre*, or other remedies may be indicated and should be used. After the convulsions or coma are relieved, you can do no better than to watch the case carefully until the natural amelioration is well established, then commence a line of treatment, looking to the prevention of contractures and the cure of the paralysis.

CEREBRAL TUMORS.—Tumors of the brain seem to be as frequent in persons under nineteen years of age as in older people; they are more frequent in boys than in girls; they may occur in any portion of the brain or membranes. The varieties that

have been diagnosticated are gumma, tubercular, carcinoma, cysts, sarcoma, glioma and glio-sarcoma. Under this head will also be included intracranial aneurism. The most frequent in young children is the tubercular. The most common location of these is in the cerebellum and on the base. They are very apt to be multiple and distributed irregularly over a very large area.

Causes.—The causes of cerebral tumor may be determined with reasonable certainty in acute cases, but in the great majority, the cause is a mere matter of speculation. Heredity, undoubtedly, is an important factor in a great many cases; direct blows on the head are probably the immediate cause in a good many instances. Extension of tumors of the ear, nose, orbit and scalp, or even from the pharynx into the brain, is occasional.

Symptoms.—The immediate condition of the cerebral circulation has a direct and marked effect on the prominence of the symptoms; this is the case in nearly all kinds of tumor, but of course, is much more marked, the more vascular the tumor. The importance of this fact is that it enables the physician to give special direction, in each case, to avoid all those things having a tendency to produce sudden changes in the circulation of the brain. In a large number of the cases, the earliest symptoms will be, in quite young children, a loss of interest in its play and in its surroundings, generally a disposition to lie down and keep quiet, with, not infrequently, an irritable, fretful disposition, coupled, in many cases, with somnolence. Occasionally, there is a marked insanity of a varying degree of intensity, or there may be, in the course of the disease, absolute imbecility. In older children, the mental inactivity also shows itself early, but more uniformly in the way of a slow perception, comprehension and reasoning. The child becomes stupid and dull, and may, at any time, become maniacal or melancholic. Late in the case, there is quite frequently such a degree of imbecility that the child pays no attention to defecation or urination whatever, and must be looked after just like a young babe.

In nearly every case, optic neuritis or choked disk will be present, more frequently double than unilateral. There may, or may not, be associated with it visual defects; I believe this symptom occurs very early in the case; it has enabled us, on occasions, to suggest the beginning of tumor some considerable time before there were other symptoms present, sufficient to cause suspicion. There is often a general impairment of sight, and the field of vision is curtailed in some special direction, or may be, in all directions.

Headache is almost universal. It is usually present before the tumor is diagnosticated, but is not, I think, as early a symptom as either of the preceding. It is usually produced or aggravated by any excitement or undue exertion, that is, by anything that causes an increased volume of circulation in the brain. It is often intermittent, may be regularly periodical, and increases in intensity with the growth of the tumor. It may be a dull, heavy, continuous ache, with more or less frequent exacerbations of great severity. It is usually accompanied by an indefinable sensation in the head. It is nearly always referred, either to the frontal or occipital region; occasionally, though rarely, to a point immediately over the tumor. If there be marked tenderness to pressure of the scalp over a circumscribed area, persistent headache in the same location, and the headache is aggravated by gentle percussion over the same area, there is a strong supposition that the tumor is cortical or meningeal.

General convulsions are very common in the progress of a tumor; they may be of any degree, from the slightest twitching of the eyes and face, to the severest epileptoid, with pronounced and prolonged coma. They are apt to appear very early in the case. They, at first, occur with long intervals; later, are quite apt to come in groups, that is, there will be a longer or shorter period between them, and then a large number of convulsive seizures a day for a considerable time. It is generally understood that these periods mark a rapid growth of the tumor or an effusion into the ventricles. Localized convulsive seizures may occur, depending on the location of the tumor, but in a large majority of cases, the convulsions are general, no matter where the tumor is located.

Vomiting is quite apt to occur on any movement of the head, after the patient has been confined to the bed some time; it may, or may not, be accompanied by vertigo, and is without reference to meals; there may, or may not, be nausea; it is not a constant symptom, there being many cases in which it is not present.

Vertigo, if present, is likely to occur at intervals; the room or objects swim around the patient; there is possibly a sudden feeling of losing the balance, as if about to fall, or a feeling of nausea and faintness; the patient will clasp the hand over the eyes to shut out the light and surrounding objects.

Insomnia of various degrees is very often present. Localizing symptoms depend absolutely on the location of the tumor in the brain; they progress gradually, and often irregularly.

Localization.—Tumors involving the cortex of the hemi-

spheres produce mental irregularities, headache, tenderness of the scalp, deep-seated and general convulsions.

If in the frontal lobes, there may be no special localizing symptoms; if in the orbital convolutions, there is apt to be loss of smell on the side of the lesion. If a case presents convulsive attacks commencing in one member and spreading to others, and is not followed by paralysis, even temporary, there is a suspicion of tumor in the frontal convolutions. The third frontal convolution will give motor-aphasia, a condition in which the comprehension of language is nearly intact, but the patient can neither speak nor write words.

The paracental lobule comprising the anterior and posterior border of the fissure of Rolando, the motor centers of the brain, will present localizing symptoms clearly defined, and important in that they frequently furnish a certain guide to cure through operative means. There is likely to be some paresthesia, followed by local spasm, it in turn followed by paralysis. The paralysis is at first in most cases a simple weakness, a feeling of heaviness; there is gradual increased loss of power, and finally complete paralysis. In many cases, while the progress of the paralysis is gradual, it is not regular, but in distinct stages. The point at which the initial sensation or spasm begins, probably indicates the exact location of the brain lesion; that is, the spasm is apt to begin in the exact muscles for which the diseased point is the cortical center. As the tumor spreads, the direction of growth may be indicated by the order in the spread of the spasm. The paralysis, as the tumor increases in size, spreads from one set of muscles to another, till in nearly every case (unless death intervenes) of tumor in the motor area, there is a complete hemiplegia. A marked paralysis preceding spasm is indicative of hemorrhage, an accident occasionally occurring.

It is impossible to distinguish between a tumor in the cortex and one of the white substance immediately beneath the cortex.

If in the parietal lobes, there is nearly always a disturbance of the pain sense, of tactile sensation, of muscle sense, and of the sensations of heat and cold. If the tumor be in the inferior parietal lobule of the left hemisphere, the patient will not be able to recognize printed or written words, can write from dictation, but not without.

Tumor in the occipital lobe produces defects in vision; if in the right occipital there will be blindness in the left half of both eyes, the patient being unable to see anything with either eye to the left of a line directly in front of him. If the left occipital be the seat of tumor, there may be in addition word blindness. Irritation in the occipital lobe gives, in many cases, hallucinations of light. Frequently recurring hallucinations of light,

followed by more or less marked convulsive action, especially if unilateral, and even temporary blindness indicates clearly irritation in the occipital lobe. If in the tempero-sphenoidal lobe, there will probably be present word deafness, a condition in which the patient understands language and can talk, but will be unable to remember names of persons or things, perfectly familiar to him, and consequently is constantly getting wrong and incongruous words into his sentences.

If located in the sylvian fissure, it may produce quite extensive paralysis, and will produce paraphasia, a condition in which the words of a sentence are all mixed up, and the conversation is likely to be unintelligible.

Tumors in the basilar ganglia are exceedingly difficult to diagnosticate. Optic neuritis is almost certain to be present. Vomiting and vertigo are also frequently present. General convulsive attacks are not common.

Tumors in the pons varolii are likely to produce bilateral symptoms; if in the upper half of the pons, there will be external strabismus from affection of the third and fifth nerve; the pupil will be dilated and ptosis present; ulceration of the cornea is quite frequent, and there is likely to be pain, anesthesia and tingling of the face. If the tumor be in the lower half of the pons, the sixth, seventh, and eighth nerves are the ones implicated, and we have internal strabismus, contracted pupil and deafness, with vertigo; also paralysis of the face, the patient being unable to close the eye. These eye and face symptoms are unilateral, with them there is likely to be present paralysis and anesthesia of arm and leg, usually not complete; the eye and face symptoms will be on the same side as the lesion, while the paralysis and anesthesia of the limbs are on the side opposite the lesion.

If located in the medulla oblongata, the glosso-pharyngeal, pneumogastric, spinal accessory, and hypo-glossal are the nerves affected; there may be difficulty in swallowing, irregular respiration, irregular or intermittent pulse, flushing of the skin, profuse sweating, polyuria or glycosuria, projectile vomiting, retraction of the head, or rolling of the head in the pillow, inability to protrude the tongue, to suck, and to articulate; of course, it is rare to find all the symptoms present in any one case.

The prominent local symptoms of the cerebellum are vertigo and ataxy. The patient is likely to have a feeling of falling or turning, always in the same direction; this is so real as to cause him to catch hold of some near object to prevent falling; this sensation with vertigo comes in distinct attacks, usually accompanied with very severe headache. There is also a characteristic

ataxic gait, the patient staggers very much as if intoxicated; the body totters from side to side, and the steps are uneven in length and character. There is often a tendency to veer toward the side of the lesion; the patient does not watch the feet as in locomotor ataxy; there may or may not be paralysis; if present, it will be of the limbs on the side opposite to the lesion. Hydrocephalus is a common occurrence in conjunction with cerebellar tumor.

Diagnosis.—The diagnosis as to the character of the tumor must be made from general considerations of the characteristics of each, and the probable predisposing tendencies in the family, or in the patient.

The main points of distinction from abscess are: Abscess often follows suppurative disease of the ear, nose or orbit, and caries of the skull. If the result of a blow on the head, abscess is likely to develop quickly; there is fever and altogether a picture of rapid, profound trouble; in abscess, the progress is apt to be more rapid at the onset, but there may be an entire remission of all symptoms for a long period, and then a sudden, severe, fatal return.

In chronic hydrocephalus, the paralysis will be of the spastic variety, will be bilateral and without local spasm.

Prognosis.—The prognosis is positively unfavorable, except in the few cases that can be clearly localized, and are so situated as to admit of operation. Death may be sudden from a hemorrhage, or the patient may waste away, finally go into a profound coma, have frequent convulsions, and die.

In syphilitic tumors, the prognosis may be much more favorable.

Treatment.—As to the removal of cerebral tumors, if they present such symptoms as to be clearly and certainly located in the cortex or on the surface of the brain at any point, or in the fissures of Rolando or of Sylvius, it is possible to operate, provided they are not of such character as to render necessary the destruction of too large an area of brain tissue. It will be found, however, that a very small percentage present a sufficiently clear-cut line of symptoms, to make the localization at all certain. My practice is never to operate unless the case is clear cut.

The general treatment consists in hygienic and sanitary measures; good full nutrition, the keeping of the circulation, especially the portal circulation, in the best possible condition, and in directing the avoidance of such things as tend to increase the blood pressure in the brain.

If the tumor be tubercular, *cod-liver oil* or other fatty nutriments should be used.

In syphilitic tumors, the *iodid of potassium* has, without question, produced a good many cures; I know of no other remedy that has. I do not use the mercurial treatment at all in these cases; I use the iodid of potassium, commencing with five grains in a half a drachm of water, three times a day, preferably before meals, gradually increasing the size of the dose till, in patients over ten years of age, they get from thirty to forty grains three times a day. In younger patients, from fifteen to twenty-five grains three times a day. If, at any time, the drug produces marked disturbance of the stomach, I stop it for a week, and give from one to three grain doses of *bismuth subnitrate*, and then commence the iodide again, with about one-half the last dose, and again increase to the maximum. There is no use in exhibiting this drug unless you follow it up persistently and in large doses. I make no apology for this line of treatment. When I learn of any other that can be relied upon, I am willing to accept it.

For the tubercular tumors, *calcarea iodid*, 3x trituration; *calcarea carb.* 30c; and *guacum*, 1x trituration, have seemed to give me good results. I have tried many others, but outside of these, have failed to get benefit in any well-marked case of cerebral tumor.

Spinal Paralysis.—Anything that produces pressure or destruction of the tissues of the spinal cord may produce paralysis in the muscles supplied by the cord. The paralysis may be in the form of paraplegia, usually of the lower extremities, occasionally of the upper, less frequently of both upper and lower. One entire limb may be paralyzed, or it may be confined to an individual muscle or set of muscles; it is accompanied by atrophy of the paralyzed muscles, and by diminution or loss of the tendon reflexes; the superficial or cutaneous reflexes are also usually interfered with; in many cases, cutaneous sensation is diminished or destroyed; the urinary and rectal reflexes are frequently interfered with. The extent of the paralysis and the sensory symptoms are directly dependent on the location, character, and extent of the lesion in the cord.

Fracture or dislocation of the spinal column in such a way as to compress the cord in its entire transverse section at any point, will produce complete bilateral paralysis of both motion and sensation of all muscles below the point of injury. If high enough up in the column, will produce paralysis of the muscles of respiration and heart, causing instant death.

There may be fracture of the spinous processes, or of the arch of the vertebræ in such a manner as to lacerate or impinge on a single trace, or a portion only of the transverse section; in

these cases the symptoms will depend on the exact location and extent of the cord lesion.

Diagnosis.—The diagnosis is made from the history of an injury of such nature as to render fracture or dislocation probable or possible, and the presence of motor and sensory symptoms referable to lesion of the cord.

Treatment.—The treatment in these cases must depend in a great measure on the judgment of the attending physician; the patient may be put to bed on an air or water mattress, mechanical appliance used to hold the column firmly in position, an operation may be performed, cutting down on to the vertebra, and either removing or replacing the misplaced bone. For the details of the treatment you will go to your works on surgery.

I have seen several cases where I am fully convinced there had been, by a sudden jerk, a dislocation producing injury to the cord, and where the dislocation was only for a few seconds, it being immediately reset, either by muscular reaction or the peculiarities of the accident, leaving the evidences of the cord lesion.

In examining a case of spinal paralysis, note with care the condition of coördination, the tone of the muscles, the condition of the reflexes, tendon and superficial, the muscular sense, the electrical reaction of the muscles, the trophic condition of the muscles, or of a paralyzed limb, the degree and exact distribution of the paralysis.

The localizing of lesions in the cord will be materially facilitated by quoting from Bramwell the functions of the spinal nerve roots:

Fourth Cervical.—Flexion of the forearm, with supination and extension of the wrist and fingers, the upper arm raised upwards and backwards.

Fifth Cervical.—Movement of the hand towards the mouth, *viz.*, raising the upper arm inwards, flexion of the forearm, with supination and extension of the wrist and fingers.

Sixth Cervical.—The movement of attention, *viz.*, adduction and retraction of the upper arm, extension of forearm, pronation towards the pubes.

Seventh Cervical.—The *spinctu ani* action, *viz.*, adduction and rotation inward, and retraction of the upper arm, extension of the forearm and flexion of the wrist and fingers so as to bring the tips against the flank.

Eighth Cervical.—Closure of the fist with pronation by ulnar flexion of wrist, retraction of the arm with extension of the forearm.

First Dorsal.—Action of the intrinsic muscles of the hand, muscles of ball of thumb, interossei, etc.

Functions of the nerve roots of the lumbar enlargement (according to Professors Ferrier and Yeo, from observations made on monkeys; and MM. Paul, Bert, and Marcacci, from observations made on cats and dogs):

First Lumbar.—Determines contraction of the sartorius, rectus, and psoas, which flex the hip upon the trunk. (P., B. and M.)

Second Lumbar.—Excites contraction of the anterior portion of the vastus externus, a part of the tensor of the fascia lata, and the vastus internus—*viz.:* the muscles which extend the leg or the thigh. (P., B. and M.)

Third Lumbar.—Similar to that of the second, with some differences in detail. It excites part of the vastus externus and the anterior part of the biceps, which is an extensor, while the posterior portion is a flexor.

According to Ferrier and Yeo, stimulation of the third lumbar in the monkey causes flexion of the thigh and extension of the leg.

Fourth Lumbar, according to MM. Paul and Marcacci, causes, in the cat and dog, movements in the posterior part of the biceps, the semi-tendinosus, and the semi-membranosus (flexes of the leg or the thigh), the second and third adductions of the thigh and the extensors of the thigh. It thus innervates three kinds of movements, which are in no respect opposed or contradictory.

According to Professors Ferrier and Yeo, irritation of the fourth root, in the monkey, causes extension of the thigh, extension of the leg, and pointing of the great toe.

Fifth Root.—MM. Bert and Marcacci find that, in the dog and cat, the fifth root presides over the movements of the tail.

According to Ferrier and Yeo, irritation of the fifth root in the monkey, produces outward rotation of the thigh, flexion and inward rotation of the leg, plantar flexion of the foot, and flexion of the distal phalanges.

First Sacral.—Flexion of the leg, plantar flexion of the foot, flexion of all the toes at the proximal phalanges, and also of the distal phalanx of the hallux. (F. and Y.)

Second Sacral.—Action of the intrinsic muscles of the foot, *viz.:* adduction and flexion of the hallux, with flexion of the proximal phalanges and extension of the distal. (F. and Y.)

In any case, having determined what movements can be performed and what group or groups of muscles are paralyzed, you will, by reference to the functions quoted above, be able to locate the segment or segments of the cord, in which the lesion is to be found.

POTTS' DISEASE.—Potts' disease of the spine is, not infrequently, a cause of a paraplegia. In these cases, it is a result of an extension of inflammation from the bone to the membrane, and to the cord, or of pressure on the root nerves of the cord, from displacement of the vertebræ. In some cases, there may be a discharge of pus within the canal, producing pressure, and in a few instances, a hemorrhage is caused in the canal, producing pressure.

A more or less regular elevation of temperature, increase in the rapidity of the pulse, tenderness over one or more spinous processes, or an irregularity in the prominence of one or more of the spinous processes, and the characteristic rigidity of the body, point to a Potts' disease.

For the points of diagnosis and the treatment, refer to your works on surgery. The object in mentioning it here is, that this cause of paraplegia shall not be, as it so often is, overlooked. In many cases of paraplegia from this cause, the paralysis has been instantly cured by extension and fixation of the spine.

MYELITIS.

Myelitis or inflammation of the spinal cord may result from caries of the vertebræ, from other forms of traumatism, from extension of meningeal inflammation, from extension inward of neuritis, or by transmission of irritation over a nerve trunk from a distant point, or from the genital organs or the rectum. It may be idiopathic, or may be caused by exposure to cold and dampness.

ACUTE IDIOPATHIC MYELITIS.—*Symptoms.*—Is usually ushered in with a chill followed by a high fever, severe pain in the back and also in the abdomen, rigidity of the muscles of the abdomen, retention of urine, sharp lancinating pains running along the course of the spinal nerves, emerging from the seat of inflammation, and paralysis of motion and sensation in both legs.

The pain in the back is increased by the application of heat over the spine, apt to be relieved by hot applications over the abdomen. The urine soon becomes alkaline and must be drawn with a catheter, as there is great liability to a secondary cystitis. The inflammation is prone to extend lengthwise of the cord very rapidly. If termination is not speedily fatal, the high fever is likely to continue from one to two weeks, subsiding gradually, and leaving the patient with a chronic myelitis and the accompanying paraplegia. A complete cure is possible, leaving no sequela.

Treatment.—The treatment during the acute stage must be conducted with promptness and vigor, great care must be used to prevent bed-sores, which are very liable to occur; keep the patient in a semi-recumbent position, cold applications over the spine continuously. In the severest cases, the spinal ice-bag may be advisable.

The galvanic current should be applied downward over the spine, using from ten to twelve milleamperes; each application should be about five minutes; repeat the application every hour or two, depending on the severity of the case.

My favorite remedies at the onset are *gelsemium*, *ergot*, *aconite*. If I find that the disease is extending upwards toward the upper dorsal and cervical region, and (bear in mind it may extend the entire length of the cord in a few hours), the respiration begins to be affected, and there seems to be no chance of arresting its progress, I put on a Spanish-fly plaster, and draw a blister about one inch wide along each side of the spinous processes along the affected region. A girdle feeling around the body, or, if the patient be unable to describe it, you will be able to detect it, as the upper border of abdominal muscle tension marks the upper border of inflammation. This may not be good practice; there may be better and surer ways to arrest the progress and diminish the inflammation, but as time in these cases is very precious; as an hour even may determine unalterably the result—and I know of no more speedy methods of nearly equal efficacy, I use and advise it.

If at the onset I find a temperature of 104° Fahr., or higher, with a very rapid, full, unyielding, hard pulse, I invariably give tincture of *veratrum viride*, in from one to four drop doses, depending on the age of the child. I give it in water, repeat the dose every fifteen minutes to half an hour, remain by the bedside, and keep my finger on the pulse until it becomes soft and does not exceed from 70 to 80 per minute. I am so particular in this that I never, under any circumstances, leave the bedside until time to stop the veratrum.

When all evidence of progression has ceased, attention should be given to the reduction of acute inflammation as speedily as possible. If the acute inflammation can be arrested before any destructive process in the cord has commenced, we will have, very soon, a subsidence of the paralysis, and a gradual return of both sensation and motion in the legs. There may be left irregularities in the heart action, and a form of paralysis belonging to the spastic variety, in which there is an inclination of the limb to remain in any position in which it may be placed, or there may be a simple spastic paraplegia, or a flaccid form of paralysis.

The remedies most likely to be of use after the inflammation begins to subside, as shown by lowering of the temperature and lessening of the pulse, are: *aconite* 3x, *gelsemium tincture*, *cimicifuga tincture*, *physostigma* 3x, *manganese* 3x, *oxalic acid* 3x, *cannabis ind.* 3x, and *kali iod.* 3x, given according to their special indications. The galvanic current can, with advantage, be continued right through the entire course of the disease. After progress is arrested, it may be given about twice a day, till the temperature and the pulse are nearly normal, then once a day—the method and strength as indicated for onset.

Prognosis.—It is always well, as soon as the nature of the case is determined, to say to the parents or friends, that it is a case in which you cannot promise to save the life, and, that the chances are, that there will be a long-continued or permanent paralysis of both legs; also that there is danger of a cystitis.

CHRONIC MYELITIS.—If the paraplegia, following acute myelitis, does not disappear within a very few weeks, we have a chronic myelitis. The chronic myelitis frequently occurs without being preceded by any acute attack; it may be produced as a result of congenital or acquired syphilis, may be tubercular, or from other sources previously mentioned as causes of myelitis.

It is impossible, as a rule, to determine the points essential to differentiation of the various forms of chronic myelitis in children. I shall simply, therefore, outline the general symptoms.

Symptoms.—It usually comes on very gradually; there is likely to be first noticed a weakness of the legs. The child is apt to complain of funny feelings, sometimes of sharp pain in different parts of the legs, or occasionally a feeling as if the legs were asleep. From older children, we are usually able to get a fairly correct idea of the kind of sensation, but in most instances, we are unable to get anything definite as to anesthesia, hyperesthesia, or band sensation. We can only obtain information as to the motor symptoms we can observe. There will usually be difficulty in emptying the bladder and obstinate constipation; the motor weakness increases until there is absolute paralysis of both legs, and also of the vesical and anal sphincters.

The trophic conditions of the paralyzed muscles, the condition of the tendon and cutaneous reflexes, as well as the peculiarity of all the symptoms, necessarily depend on the exact location and extent of the lesion.

The paraplegia is more often of the flaccid character, accom-

panied by lowered cutaneous sensations or anesthesia, and atrophy of the paralyzed muscles; but in some cases, there will be a spastic paraplegia, with cutaneous hyperesthesia, and without any atrophy. If the paralysis becomes complete, and the patient is bedridden, bed sores are very likely to occur.

There is, at all times, danger of cystitis from retained urine, and of extension of inflammation from the bladder to the kidneys. Respiratory and heart complications are quite common.

Diagnosis.—The lesions from which chronic myelitis is to be distinguished in children, are primary lateral sclerosis, Potts' disease and functional paraplegia.

Prognosis.—A cure can hardly be promised, but a hope of arrest, and even of improvement, may be entertained. Cures are reported by others, and have occurred in my own practice.

Treatment.—My treatment consists in spinal extension, electricity, dry cupping over the spine, nerve vibration, massage and remedies. The remedies I use are: *manganese* 3x, *ergot* (Squibb's fl. ext.), in from three to ten-drop doses, three or four times a day; *cannabis ind.* 30c, *argentum chloride*, 3x trituration, *oxalic acid*, 3x trituration, *calabar bean*, 3x and 30c, the various *salts of potash* in the 3x to the 12x triturations, and *strychnia* 30c, according to indications. I have never been able to see any results from the administration of *mercury* in any of these cases, even when of syphilitic origin.

Electricity: I use the galvanic current, apply a downward current of from five to ten milleamperes, daily.

Spinal extension: I use Sayers' apparatus, with neck and arm supports, raise the patient so that the feet just clear the floor, daily. The first three or four days for fifteen seconds, increase the time of suspension gradually until it is about ninety seconds.

Dry cupping is used directly over the affected portion of the spine daily; allow the cups to remain from five to fifteen minutes. The surface, for some time after the removal of the cups, is likely to be discolored quite markedly. In cases where there is atrophy and a low circulation in the legs, the vacuum boot is often of great service.

Nerve vibration is to be applied daily, over each spinous process, for about ten seconds, as nearly as possible at the same time of day; commence at the cervical region and go down the spine.

ANTERIOR POLYOMYELITIS, more commonly known as Infantile Spinal Paralysis, is a focal, localized or circumscribed myelitis. The lesion is confined to the anterior cornua of one segment usually, but three or four segments may be implicated. In most cases, there is but one focus of inflammation in a

segment, but in a few cases, both anterior horns are affected; then again, there may be two or three distinct foci in different and separated segments of the cord.

Causes.—In a great majority of the cases, no cause can be assigned. The neuropathic heredity, exposure to damp and cold, injury and reflex irritation are the most common assignable causes.

Symptoms.—We recognize a form that seems to be functional and is entirely dependent on reflex irritation; it usually appears in conjunction with teething, or as a result of genital irritation. In these cases the onset is quite frequently accompanied with some febrile disturbance, or a mild convulsion, or irritability. It is noticed suddenly that the child does not move a leg or an arm; that when you take hold of the member, it is limp, and offers no resistance to being moved in any direction.

When called to a case of this kind, you will note the absence of any indications of cerebral disturbance; that there is no tendency to contracture or to resistance. Examine as to the condition of the gums, also as to the condition of prepuce or clitoris. If you find any sufficient cause for reflex irritation, there is a reasonable chance that, in a few days, motion will begin to return to the paralyzed member, that no atrophy will take place, and that, in a few weeks, the child will be perfectly sound. It is probable that in these cases, there is sufficient local congestion in certain anterior cornua to prevent function, but no inflammation to produce destruction. Of course, any source of reflex irritation should be removed at once.

The onset of true polyomyelitis is usually sudden, is most frequent between the second and ninth year, although no age is absolutely exempt. The child goes to bed apparently in perfect health; in the morning it is found that one foot, one leg below the knee, the thigh, or the entire leg and foot, or a hand, forearm, upper arm, or the entire arm and hand, or it may be some part of one leg and of the arm on the same or opposite side, or, exceedingly rarely, both arms or both legs, hang perfectly limp and flaccid. The paralyzed part offers no resistance to movement in any direction; the superficial and tendon reflexes are very much diminished or entirely absent; the part is apt to be colder than the adjacent parts.

In by far the greater number of cases, the child feels well, and there is no febrile disturbance, or other evidence of sickness. In a fair minority of cases, there will be, for a few days preceding, or the first few days of the attack, mild febrile disturbance and irritability; occasionally the attack is ushered in by a distinct convulsion. I have never seen a case of polyo-

myelitis commence with, or accompanied by, high temperature, except when occurring in the course of some acute disease.

In a few days, there will be some improvement in the extent of the paralysis; that is, some of the muscles that are paralyzed at the onset, regain the power of motion. After the first few days, the paralysis remains stationary; there is no tendency to extension from one part of the cord to another. Very soon the paralyzed muscles begin to atrophy; this process continues for some considerable time, and then remains stationary. After a time, contracture in the muscles opposed to those paralyzed begins to appear; for instance, if flexor muscles are paralyzed, the extensors opposed to those flexors will begin to shorten and become contracted; this contracture is due, in a great measure, to the position in which the member is almost constantly kept. From these contractures in these cases, a large percentage of the various forms of acquired talipes and other deformities result. The paralyzed portion, after the first week or so, is always colder than the adjacent part; there are no marked sensory disturbances.

Diagnosis.—This is so distinctly a focal lesion that we often find the paralysis restricted to one set of muscles. There is very little doubt as to the diagnosis, after the paralysis appears. In those cases where there is febrile disturbance preceding the attack, polyomyelitis will almost never be thought of until the occurrence of the paralysis.

The absence of any evidence of cerebral disturbance, the sudden onset of the complete paralysis, confined to individual or contiguous groups of muscles, without sensory symptoms, fully determines the nature of the case. The bladder and rectal functions are never permanently interfered with; they may be for three or four days.

Prognosis.—This disease, except in the few cases I have designated as functional, never tends to recovery. It does not interfere in any way with the general health. The bone development in the paralyzed member is apt to be retarded. No function of the body outside the affected part seems to suffer in the least, except in very rare cases, right at the onset; there is no fear of a fatal termination. The child will grow up unable to use the certain set of muscles and with some deformity. I must be excused for occupying a little extra space here. The parents will be told that the child will outgrow the trouble—to rub the muscles, to procure a battery and use electricity, to go to different baths, and a variety of things. The parents themselves will go from one doctor to another, looking for those who will promise a cure in the shortest time. The lack of interest, the inclination to avoid painstaking details, and the feeling of

not wanting to bother, on the part of the doctor, combined with impatience, and sometimes, also, lack of interest, the want of confidence in doctors, and the desire to have the job done as cheaply as possible, on the part of the parent, are directly chargeable with more deformities than the disease itself.

It is my uniform habit to say to the parent: "This case, if it is to be cured, must be under a systematic line of treatment, directed by one competent physician, who is willing to take the time and bother for a period of from three to five or six years. The treatment will, of necessity, be expensive, and you will be importuned and exhorted to try a hundred other things; you will, time and again, get discouraged because improvement is so slow; but on this line is a possible cure, and on the other, that of changing from one to another frequently, there is no possibility of a cure."

In my own experience the results have averaged better with the cases coming to my clinics, than in private practice, owing to the fact, I am sure, that they will stick to a line of treatment, while in the wealthier families there is a constant tendency to change.

Treatment.—Always examine the eyes, for refractive troubles and heterophorea; the nasal passage, the throat, the gums, the chest and the abdomen, the genitals and the rectum. Remove any possible source of irritation at once. As to remedies, I have never been able to see any results from their administration internally, except in those of tubercular, strumous and syphilitic origin.

In the tubercular, *guacum* is, I believe, indicated in a large percentage of them, and I am satisfied that I have seen positive results from its use. I have found marked indications for other remedies in a few cases, and had good results follow their administration.

In strumous cases, the remedy must be carefully selected, on the line of totality, and almost any remedy may be found to be indicated.

In the syphilitic cases, *kali iod.* is as yet my chief remedy. I begin with the 3x, and if no results are apparent in two weeks, I give the 2x, and in some cases, not many, have found that I did not obtain results till I had increased the dose to five grains three or four times a day.

The general nutrition must be carefully attended to. Keep the child well nourished; good air and plenty of it is important; keep the patient out doors as much as possible.

Use mechanical appliances to overcome the deformities; do not operate for talipes until the paralyzed muscles have commenced to respond to the will.

Electricity I have not found of any avail in removing the lesion in the cornua. It is of great service in the treatment of the paralyzed muscles.

Hot baths, regular daily massage, inunctions of various kinds, passive exercise, and nerve vibration comprises the line of treatment.

Nerve vibration has seemed to do more toward restoring function to the anterior cornu, than any other one thing. I apply it daily for some weeks, then rest from it entirely for three or four weeks. It should always be used daily, when used at all. The effect is better when used in periods, with periods of cessation. It should be continued throughout the entire treatment. Apply the hammer over the root nerves of the diseased cornu, also over the spinous process, also over the motor nerve point of the paralyzed muscles. Apply at as near the same time each day as possible, and in the same order from point to point; hold the hammer on each point about two minutes.

Beside the general hot baths, I have a bucket made sufficiently large for the foot to stand flat on the bottom, and high enough to immerse the entire leg, if the paralysis is in the leg; fill this with water at 100° Fahr., have the patient stand with the paralyzed leg in this, then slowly pour in hot water, taking pains not to have it strike the leg, until the temperature of the water is 103° Fahr., keep it at this point ten minutes. In case it is the arm that is paralyzed, have a vessel made of proper dimensions for the arm and use it in the same way. I frequently give this kind of a local bath twice a day, following it with brisk rubbing with a coarse towel.

Other points in the treatment will be found under the general treatment of paralysis.

SPINAL HEMORRHAGE is occasionally found in the new-born, usually in the membrane; the paralysis is of the flaccid variety, and there is a tendency to spontaneous recovery from absorption of the clot. In a few cases, on account of the pressure and non-absorption of the clot, a secondary descending degeneration follows. The diagnosis is made by the distribution of the paralysis and the absence of cerebral symptoms.

Symptoms.—The sudden onset of a paraplegia, accompanied with evidence of pain, and, if the child be old enough to explain its sensations, a girdle feeling about the body, indicates a hemorrhage in the cord or membranes. There will be paresthesias, the tendon reflexes will be diminished or absent, the cutaneous reflexes diminished or lost.

Prognosis.—There will be in most cases a partial recovery very

soon, and often a nearly complete spontaneous recovery in a few weeks, that is, unless the hemorrhage occurs in conjunction with some chronic disease of the spinal column, or of the cord or membranes; even in these cases there is likely to be a partial recovery,

Treatment.—The treatment consists in quiet, the best sanitary and hygienic surroundings, and attention to the special nutrition of the paralyzed muscles. The remedies that I have used and that have seemed to be of value are: *Aconite* 30c, and *arnica* 30c.

PRIMARY LATERAL SCLEROSIS is known also as Spasmodic Spinal Paralysis and as Spastic Paraplegia.

It seems sometimes to be congenital, and often appears before the third year, but may appear at any age. The causes have never been determined, so far as I am aware.

Symptoms.—In a large majority of the cases the first symptoms appear in infancy. The first thing that is noticed is that the child's legs appear stiff; when lying down it will move them about, but is unable to stand on them. The child learns to walk very tardily, and is not firm on its feet; any attempt to use the legs increases the stiffness. The legs slowly but gradually become weaker and weaker, until they become useless. Now, in attempting to stand, the legs become rigid, the balls of the feet rest on the ground, but the heels are raised up, the toes are inclined to cross each other; the feet and legs, too, become crossed; there is no pain and no fever; the joints immediately appear stiffened if handled; there is no tremor. If a joint be forcibly bent—for instance, the leg flexed on the thigh, which causes no pain—it will immediately straighten out as though worked by a spring. There are rarely any trophic disturbances. The tendon reflexes are exaggerated. The rectal and bladder sphincters remain intact. The rigidity remains during sleep. The rigidity and inability to control or coördinate movements, and all symptoms increase steadily and slowly to a point, then remain stationary. This disease does not tend to death.

The mind in many cases is as bright and clear as in other persons of the same age. In a few instances there is a lowered grade of mentality, but I believe not due to the disease, but to concomitant trouble.

Treatment.—The only treatment that promises anything, so far as I know, is cold to the spine and legs, nerve vibration and spinal extension.

I apply cold douches to the spine and legs daily, observing with care that the patient does not remain chilled for any length of time following. Apply spinal extension by means of

Sayer's apparatus on alternate days, keeping the patient suspended from fifteen to sixty seconds; nerve vibration, by applying the hammer over all the spinous processes and the nerve roots on each side of the spine, daily, a half minute at each point.

HYPERTROPHIC PARALYSIS, PSEUDO.—This is a rare disease in this country, but is met with occasionally. It commences in early life, usually before the second year, but occasionally not until the second or ninth year. It runs a slow, steady course of from ten to twelve years commonly. Death is most frequently the result of implication of the respiratory muscles; the immediate cause is quite frequently some form of bronchitis.

Symptoms.—The earliest symptoms are weakness of the legs, soon accompanied with a tendency, when standing, to spread the feet far apart; later to throw the shoulders backward, curving the spine backward very markedly. This is an effort to keep the center of gravity of the body back of the point at which the feet touch the ground; this is essential, in order to preserve the equilibrium. In rising from a sitting posture or from stooping, the patient puts his hands on the knees to assist in raising the trunk. In an advanced stage, the patient can only raise himself from a lying position by first, with the face downward, raising himself on his hands spread wide apart, then slowly drawing one foot at a time forward, kept wide apart, till the feet and hands are fairly close together (the patient in this position is on all fours, that is, both feet and both hands are on the floor and the arms and legs straight); then, by putting first one, then the other, hand on the knee and raising the trunk, by the aid of the arms, to a perpendicular. In nearly every case, at an early stage, the muscles of the calf of both legs begin to develop and become large and hard; they are apt to become enormously developed, as do also the glutei and other muscles. While some of the muscles are becoming hypertrophied, others are gradually paralyzed and atrophied.

The distribution of the atrophy and paralysis, and of the hypertrophy, is very uneven and irregular.

The gait is characteristic; it is very awkward, a rolling or wabbling gait; something of a duck walk. The feet are kept wide apart and the shoulders thrown far back. Any extra strain on the muscles, manifestly increases the difficulty of walking. At times, the patient has to exercise considerable ingenuity in order to walk at all, and gets into very ludicrous positions in attempting to walk. In the late stages, the child becomes absolutely helpless. There is apt to be contracture of some of the muscles, notably of the posterior leg muscles, causing a true talipes equinus.

The mind is affected to the point of idiocy in many cases, but probably not by this disease; it is rather an accompaniment produced by the same inherent cause, whatever that may be. In many cases, the mind is as bright and clear as in other children of like age. There is at no time any febrile disturbance.

Prognosis.—The prognosis is decidedly bad.

Treatment.—Various forms of baths, massage, and the Faradic current have been recommended, and in a few cases, it is claimed the disease has been arrested. I have never treated a case.

PARALYSIS OF THE PORTIO DURA, or Facial Paralysis, should be specially noted. It may be serious or of little import, depending on its cause. This paralysis may be occasioned by a lesion at any point along the course of the nerve, from its peripheral termination to its origin in the floor of the fourth ventricle.

Causes.—The peripheral portions may be injured by exposure to severe cold—a very common cause—by being involved in inflammation of surrounding tissues, by blows on the face, or at birth by the forceps during labor. In the portion passing through the fallopian canal, it may be involved by caries of the petrous bone, usually from otitis, or by fracture of the base of the skull. Within the brain we may have as causes, tumor, hemorrhage, effusion, thickening of the membranes, abscess or exudation.

Diagnosis.—In diagnosticating this condition, you will examine carefully in every case as to the presence of any discharge from the ear, or any indications of trouble in the ear; the condition of the muscles of the tongue and palate, the presence of any collateral brain symptoms, or of any sensory symptoms. Follow the anatomical distributions of this and other cranial nerves, that might be implicated, from their source along their entire course.

If the paralysis is noticed at birth and is confined to one side of the face, a comparatively speedy recovery is almost certain.

If the paralysis is peripheral, the affected side of the face will be smooth, the eye will not close or will only partially close, and when the child laughs or cries the sound side of the face will be drawn and wrinkled naturally, while the paralyzed side will remain immobile; the mouth will be drawn to the sound side; the eye on the sound side opens and closes naturally, that is, you will notice that in all things in which the muscles of the face are called into action, those on the sound side respond, while those on the paralyzed side remain passive.

If the paralysis is the result of exposure to severe cold,

massage and electricity will almost invariably result in a cure in a few days or weeks. If the result of a blow on the face, the prognosis will depend on the extent of the injury. If there be a cut severing the nerve, not followed by sloughing or ulceration, you may quite safely predict a speedy recovery. If, however, there is extensive sloughing, ulceration, or an extensive abscess should form, there may be destruction of a sufficient extent of the nerve to render reuniting impossible.

If the paralysis is the result of inflammation of the surrounding tissues, the prognosis depends entirely on the extent of the destruction of the tissues. In these cases, after the inflammatory conditions are cured, the treatment of the paralysis is the same as for the uncomplicated cases, the difference being that in the most severe cases you cannot predict results. It is sometimes advisable to cut down upon the nerve, and either loosen it from adhesions that have formed, or take up the two ends of the nerve and stitch them together.

If the lesion is in the fallopian tube, the muscles of the soft palate will be affected, the uvula hanging to one side; the arch of the palate will be flattened on the same side as the facial paralysis. There is a tendency for the mouth to be dry, often there is some difficulty in swallowing, and there may be a tendency for liquid to regurgitate through the nose. There is frequently a tendency for food to collect between the teeth and the cheek, or difficulties experienced in moving food from that side of the mouth with the tongue. These symptoms are added to the paralysis of the side of the face. There will, nearly always, be in conjunction an offensive discharge from the ear. With this combination present there is certainly trouble within the tubes, and the prognosis depends entirely on that of the producing disease.

The treatment consists in preserving the nutrition and life in the paralyzed muscles, and such as is indicated for the cure of the producing disease.

If the lesion is within the cranial cavity, there will be disturbances of sensibility, squinting, deafness, or a hemiplegia; there will be evidences of brain lesion affecting other nerves as well as the facial.

A paralysis of the sensory branch of the fifth nerve is sometimes found in conjunction with that of the facial. If the affection is posterior to the Gasserian ganglion, there will be anesthesia of the side of the face, but not of the conjunctiva. If anterior to the ganglion, there will be anesthesia of the side of the face, also of the conjunctiva. There will be danger of ulceration of the cornea, and anesthesia of the anterior half of the tongue.

Prognosis.—The prognosis is necessarily that of the intracranial producing lesion.

Treatment.—The treatment consists in the preservation of the local muscular nutrition and that adapted to the intracranial lesion.

THE GENERAL TREATMENT OF PARALYSIS.—The nutrition and integrity of the paralyzed muscles must be maintained as far as possible, in order that, when the motor impulse can be transmitted from the motor center in the brain to the muscles, they can respond. Therefore, while the lesion, whatever it may be, producing the paralysis, is being treated, the muscles themselves must receive their share of attention. Very frequently one or the other is neglected. The one most frequently neglected is the producing lesion.

If there be no tendency to atrophy other than comes from non-use, thorough massage and kneading daily, for from half to an hour should be applied. It is wise to have massage to the entire body, to assist in maintaining the general equilibrium of muscle tone and of the circulation. Some form of oily substance should be used with the massage, such as cocoa butter, vaselin, olive oil, and others.

Passive exercise of the muscles should be given every day; an attendant should, a number of times each day, gently move the paralyzed member or members in every direction, flexing and extending, adducting and abducting, and from time to time have the patient make efforts to resist these movements. Stretch and relax every affected muscle in the affected part. If there is a tendency to contracture, either from position, or from central irritation, the shortening muscles must be placed on a stretch, for from fifteen to thirty minutes, six or eight times a day. If this is not sufficient to prevent contraction, some form of mechanical appliance should be devised for each individual case. Where possible, the appliance should be fitted with rubber bands, or what are called rubber muscles. While it is better not to have the tension too rigid, it must be strong enough to keep the contracting muscles on a tension; the apparatus should not, except in rare cases, be worn constantly. It may be worn for stated periods of one, two, or three hours, and from one to three times a day, depending on the judgment of the attending physician, and not at all on that of the patient or friends. It is advisable to encourage the patient to make frequent efforts to move the paralyzed muscles by their own volition. Be careful, however, in doing this, not to allow the patient to become discouraged because it is so long before they can succeed.

Electricity is an almost universal remedy for paralysis. It has done much harm and some good in the hands of the laity, quacks, and those physicians who will not take the trouble to familiarize themselves with its sphere of action, its indications and contra-indications. It should be studied with the same care as any other remedy.

It has accomplished wonders. It will do, just as any other remedy will, certain things that nothing else will. Excepting where I have suggested its use for the special lesion, it should not be applied in any case of organic, sudden paralysis until one or two weeks after the onset. I almost invariably use both the galvanic and the Faradic currents. I rarely, almost never, use the static in the treatment of paralysis.

Any of the batteries or machines found in the surgical instrument houses will answer the purpose. It is wise to use a milleampere meter always with the galvanic current, but in this kind of work it is not an absolute necessity. A twelve-cell portable galvanic battery and a Faradic machine, or a combined galvanic and Faradic battery, will answer the purpose. Of course a stationary office battery, or a more powerful portable instrument may, in rare instances, be needed.

I first test the paralyzed muscles with the galvanic current, commencing with a very mild current, interrupted within the metal circuit, and gradually increase the strength until the interruption produces a spasmodic motion in the paralyzed muscle, provided such result can be obtained without too severe pain, or the production of cutaneous electrolysis. Now, note the direction in which the current has been passing, the number of milleamperes or the number of cells necessary to produce the spasmodic motion, then reverse the current and test as before, noting the strength of current required to produce the same effect. In the treatment of the paralyzed muscles, use the current in the direction from which you get action from the current of the least strength. Use a current of just sufficient strength to produce mild contraction. Give it from two to three times a week. Make each application, if to individual small muscles, from two to three minutes. If to individual large muscles, from five to seven minutes; if to an entire limb, from fifteen to twenty minutes. The pole nearest the center may be placed over the spine, or over a nerve trunk at a point where it lies near the surface, and between the paralyzed part and the spine or head. The opposite pole is to be applied over the motor nerve points of the paralyzed muscle. The current should be interrupted within the metal circuit from one to twenty times per minute.

The Faradic current is to be applied to the paralyzed muscle

for the purpose of retaining muscular nutrition, retaining muscle habit of contracture, and exercising the muscle. The direction is, for the most part, immaterial. It should be applied directly to the paralyzed muscle. It may be by means of a foot bath, with one of the poles dropped into the water near the foot, or a large wet sponge electrode may be placed under the feet, the other electrode being applied over the various parts of the paralyzed muscle, particular attention being paid to those points causing marked contractions in the muscles. Both electrodes may be applied by the physician in such manner as to produce marked contractions at all parts of every affected muscle. This can be accomplished by applying the electrodes transversely through the various muscles, or longitudinally. The current should be of sufficient strength to produce marked, but not excessively painful, contractions in the paralyzed muscles. The application should be daily and from fifteen to thirty minutes, except where individual muscles only are affected, then a shorter time, depending on the size of the muscle. Where there is marked muscular contracture that does not yield to mechanical means alone, the galvanic current, applied regularly from ten to twenty minutes, over the contracted muscles without any interruptions in the circuit, may be of decided service. The Faradic current, applied to the opposing muscles strong enough to produce contractions in them of sufficient force to place the contracted muscles on a stretch, will frequently assist in overcoming contracture.

In the treatment of paralysis, electricity is not beneficial unless followed up thoroughly and with judgment. The giving of an occasional application is useless. In those cases where there is atrophy of the paralyzed muscles, due to central trophism, and where it is impossible to get contractions from a safe strength of current, apply as strong a current as can be borne without injuring the skin, or frightening the little patient to a detrimental degree.

In general, where you cannot get a guide as to the proper direction in which to run the current, apply the negative at the more distant and the positive at the nearer point toward the spine or head. If anesthesia is present, the electrical brush will frequently be of great service. The application should be daily or on alternate days, and not exceed from three to five minutes, with a current of sufficient strength to make the skin pink.

Where atrophy of the paralyzed muscle is prominent, the massage, the oiling, and the electricity should all be used, and in addition, heat. My preference is moist heat. There is no end to the variety of baths prescribed for cases of paralysis.

Any of them are useful if given properly. In cerebral paralyses, heat treatment or hot baths are not usually indicated, and many times are positively dangerous. Thus, in hemorrhage, thrombus, tumor, or softening of the brain, or if there is a tendency to congestion, heat treatment may, in any hands, prove instantly fatal, or do irreparable damage.

Baths may be local or general, that is, applied to the paralyzed parts, as recommended under polyomyelitis, or to the entire body. The object of the heat treatment is to elevate the body temperature. If the paralyzed member alone is given the bath, its temperature must be raised by the bath, if any good results are to be obtained. If the bath is to the entire body, the body temperature must be raised. It is my custom to take the temperature of the patient under the tongue on entering the bath, to regulate the temperature of the water, or of the steam or hot air chamber, and the length of the time of the bath in such manner that the temperature under the tongue is raised from one to two degrees. On coming out of the bath, the patient may be allowed to lie in a pack for a time, or be immediately rubbed dry with a coarse towel, vigorously used. I am confining these directions to paralytics. Thorough massage may be used immediately following the bath, or at some other time in the day, depending on the special condition of the patient. In the atrophic cases, where the circulation is markedly decreased in the paralyzed muscles, what is known as the vacuum treatment, will often be of very great service. An arm or a leg, or both legs, or the entire body from the neck down may be placed in the receiver. This treatment should be followed up daily. Care must be taken to exhaust the air sufficiently to force the circulation into the capillaries, but not to produce stasis in them.

In all cases of paralysis the functions of the bladder and bowels must be continuously and carefully looked after. Where constipation is the direct result of the producing lesion, and not the fault of the digestive organs themselves, mechanical means must be used to move the bowels. In these cases I think I have had more satisfactory results from the internal administration of *ox gall*, either alone or in some combination, than from any other laxative. A common prescription with me is:

℞ Fel. Bovinum Ex .....grs. 60
Hydrastia Mur .....grs. 3
Aloes Aqueous. Ex .....grs. 3
Calabar Bean. Tr.....gtts. 24
Div. Capsules.....12
M.

One at night is usually sufficient to cause a free and easy movement of the bowels each day, without any appearances of cathartic action. Occasionally it will be found necessary for a short time to give two or three a day. *Aluminum* 30c, *natrum nur.* 30c, *opium* 3x or 30c, *nux vom.* 3x, and other remedies will sometimes accomplish the result. I never use the mechanical means when I can obtain results from the best selection of a remedy I am able to make. In some cases I find it necessary to use enemas in the rectum or up into the colon.

Remedies must be selected to cover the particular lesion and a paralysis. It is obviously impossible to indicate a list of remedies for paralysis in general. A list that may be indicated in the various paralytics, would comprise nearly the entire *materia medica.* My own experience has been that when I had ten or fifteen remedies that I considered adapted to paralysis, I did not affiliate my remedies as closely, nor obtain as good results, as I do now. My method of late years has been to first look for my indications, without considering the factor of paralysis at all. I look for a remedy that will cover the symptoms and the pathology proximately. I use the word proximately here for the reason that there are many lesions that must be considered as traumatic or accidental, and it is obviously impossible that any remedy can be homeopathic to these.

CHAPTER VI.

HEREDITARY ATAXY.

In this there is degeneration in several of the columns of the spinal cord, the posterior columns being most profoundly affected. The lateral columns become affected almost invariably in the course of the disease.

The heredity is rarely direct; that is, it is not common for the parents to have had ataxy, although this does occur sometimes. Dissipation, syphilis or insanity in the parents, or any of the conditions that reduce materially the nerve force of the parent, are likely to beget a neuropathic child, a child particularly susceptible to nerve trouble.

In this particular form of ataxy, it is supposed that the posterior and possibly the lateral columns, are defective at birth.

It seems to be more common in America than in any other country, but even here there are less than seventy cases reported. In this country it seems to be more common in girls than in boys. The first evidences usually appear at about puberty, sometimes, however, as early as eight years of age or as late as sixteen years of age. In some instances, several children in one family are afflicted. The duration is from five to twenty years.

Symptoms.—The early symptoms are a weakness of the legs, soon followed by an uncertainty in their movements. The patient loses the power of making various motions as he desires; the foot, unless aided by the eye, cannot be placed on a certain intended spot. The patient is uncertain as to the position of his feet and legs; he is unable to tell, at times, whether a leg is in the bed or hanging out, whether the legs are crossed or not. Vertigo is likely to be present. There is usually some pain, but not marked. Within a year from the onset the knee jerk is abolished. The cutaneous reflexes are likely to be more or less interfered with and are apt to be irregular.

The disease is essentially a progressive one. There may be long periods in which there is no noticeable change. In five or six years, symptoms, similar to those in the legs, appear in the arms and hands; the patient loses the power of determin-

ing, by sensation, the difference in the shape of objects placed in the hands; also the power of determining, by sensation, differences in the weight of objects. Later, the patient loses the control of the tongue, and is unable, while perfectly familiar with words, to use the tongue in a way to articulate with any certainty. The head may now have an oscillating motion, and the extremities become choreic. In most cases, some form of talipes is developed. Nystagmus is common, other eye troubles are rare. There is no optic neuritis or atrophy. The bladder and rectal conditions are not interfered with. There are many symptoms occurring in occasional cases, but those mentioned are essential to the disease, and are sufficient to determine the diagnosis.

Prognosis.—The chances of recovery are not good; very few, if any, cures are reported.

Treatment.—The patient should be kept as quiet as possible, free from all excitement, and have very little physical exercise. The environments should all be of the best. The hygienic and sanitary conditions as perfect as possible.

Massage should not be used. Passive exercise is not to be given. The heat treatment, with just sufficient surface rubbing to get skin reaction; great care, however, must be used not to burn or scald the skin. The baths, if used, should not be oftener than twice a week. Electricity should not be administered.

Spinal extension, using Sayer's apparatus, beginning with fifteen seconds, gradually lengthening the time to two minutes every alternate day, should be used in every case. Nerve vibration promises to give results in these cases. It should be applied daily for a number of weeks, with intermission of an equal length of time. The hammer should be applied over the entire soles of the feet, over each tendon at the base of the toes on the upper side of the foot, just behind each malleolus, over the internal and external saphenous nerves, over the anterior tibial at the instep, on the popliteal nerve in the popliteal space, over the external popliteal as it passes over the external condyle of the femur, along the course of the sciatic nerve, over the femoral nerve in the groin, and over corresponding points in the hands and arms. I use about two minutes on the sole of each foot, and one minute at each of the other points, making every treatment as near uniform as to time of day and order of procedure as possible.

While I have had no experience with this treatment in the hereditary ataxy, I have had sufficient experience with it in the ataxy occurring in adults to warrant the statement that it is a curative agent of great value in ataxy.

ACQUIRED LOCOMOTOR ATAXY, it is claimed, occasionally occurs in children. While a case has never been presented to me, the reports are from men whose diagnostic attainments forbid doubt.

The symptoms would be the same, except that the progression is less marked; there is likely to be diplopia early in the case and optic atrophy later.

The prognosis and treatment would be the same.

CHAPTER VII.

IDIOCY.

AUTHORS are agreed in recognizing idiocy, imbecility and feeble-mindedness, as grades of the same condition. There is no difference except in the degree of mental development, the idiot possessing the lowest possible mentality, the imbecile the greater mentality, and the feeble-minded approaching to that of other children, of like age and advantages, in its reasoning powers.

Causes.—The cause is primarily a lack of cerebral development, either of all parts of the brain, or of individual portions. This lack of development may be due to prenatal or to postnatal influences.

Insanity, hysteria, alcoholism, great excess in the use of tobacco, opium, chloral, or other drugs, organic nerve disorders of the more profound type, syphilis, tuberculosis, great dissipation in social or business life, constant criminal life, and prolonged and excessive sexual dissipation in the parent or parents, without doubt tend to arrest regular cerebral development. Long-lasting labor, by keeping the head compressed unduly, causes many babies to be born with suspended animation. Statistics show that a large percentage of those mentally defective, had suspended animation at the time of birth. The general health of the mother, any violent emotion or profound and protracted grief during gestation, may affect the brain development of the child.

Cerebral and meningeal hemorrhages, thrombus or embolism, occurring either at birth or subsequently, may cause an arrest of development. Cerebritis, and cerebral meningitis in infancy, or frequently repeated and severe convulsions, are fruitful sources of irregular and defective development.

Any disease of the brain that produces pressure or serious disorders of the circulation of the brain, may cause defective development.

Irritation of the genital organs, either from anatomical malformations, or from masturbation in either sex, play a not insignificant part in producing imbeciles and the feeble-minded. To cigarette smoking a number of cases are clearly due.

Profound emotions, such as fright, sometimes seem to arrest

development. Traumatism of the head comes under the diseases of the brain that may effect its development. The intermarriage of close relatives does not have any influence.

Many cases are found where it is impossible to form any idea as to the cause.

I shall not here make any classification, other than to call attention to differences between the congenital and the acquired.

In the congenital cases, there are frequently deformities of the body as well as of the brain, while in the acquired this is very uncommon. In the congenital cases, the mental development, if there be any, is slow and somewhat regular from birth. In the acquired cases, the history will show that the child, up to a certain time, was as bright, mentally, as other children of the same age, having like opportunities and environments; then some accident, an attack of sickness, or of long-continued, frequently recurring, severe convulsive attacks, and with no mental development from this date, or a very slow development from this time.

In some cases the child loses, during an acute infectious or febrile disease, almost all mentality, temporarily only. At other times the mentality is permanently lost, so that the child has no more mind than a babe. The mental development may progress slowly but steadily from the time of its arrest.

In many instances there is found an exceedingly low grade of mentality, a pronounced idiocy, and yet great brightness is shown in some one direction. It is not very rare to find the feeble-minded person, that is far above the average in some one thing. I have a little patient of nine years who has locality so thoroughly developed that, even though a stranger in this large city, he will remember any place or building that he has ever once casually seen. I had a case, a little girl of ten, with a general mind certainly not over two years, that seemed to never forget a date. One of our greatest cat painters was an imbecile. These peculiar, single precocious traits may lead in any direction. Imbeciles and idiots are also often deaf and dumb.

It is not always an easy matter to determine whether a child is a mute, or whether there is not sufficient intellection to give evidences of hearing and to converse. I do not intend to say that there are many cases of this kind, but occasionally it is found, by prolonged and close scrutiny, that the hearing is fairly good, when for a number of years the family and friends, and even expert aurists, as well as neurologists, have been certain of total deafness. A child deprived of sight and hearing from birth, or at an early age, may, from this alone, be feeble-minded.

The feeble-minded of all grades differ as much in temperament as sound people; among them are found the amiable and the irritable, the cheerful and the morose, the tractable and the stubborn, the quiet and the noisy, the gentle and the vicious.

There may be associated with the feeble mind hallucinations, delusions and illusions. There may be moral defects of nearly all kinds and grades.

Treatment.—Treatment of all grades of the feeble-minded imposes on the physician the gravest responsibility. The tendency to pure routinism, and to be perfectly satisfied by furnishing an asylum, is directly chargeable with preventing many persons from becoming useful members of society. The physician who only casually looks at a case of this kind and does not learn everything that is to be learned about the patient, the hereditary influences and the environments, fails in his duty. If he has not the knowledge, ability, time, or interest essential to the careful and thorough examination, he should command the parents or guardians to consult some one who can and will care for the case intelligently. The excuse that there is no place for them where intelligent treatment can be had, is no longer tenable. There are institutions, both private and public, in various parts of the country, under the care of reliable, educated, intelligent and enthusiastic physicians.

The first element in deciding on a line of treatment is, to determine whether congenital or acquired, and the cause. Is the cause one that is still active, is still a cause of interference of development, a present source of irritation, or has it done the damage and ceased to be active? If there is any present source of irritation, or of interference with the circulation of the brain, or of its nutrition, or anything that might possibly act in this way, treatment should be directed to its cure. If convulsions, try to cure them; if a depressed section of bone, remove or elevate it; if an adherent prepuce, circumcise. Whatever possible present source of irritation, or interference with circulation or development of the brain can be found, I again say, undertake to cure it.

The next step in the treatment looks to a perfect general nutrition. Proper food and good air, hygienic and sanitary surroundings, and judicious physical exercise, must all have careful attention and be intelligently prescribed. The matter of physical development is probably as important as any one element of treatment, and usually receives almost no attention.

In the line of remedies, I have found unmistakable good results where some cachexia was present, or where they were prescribed for the cure or removal of a present acting cause. Where the only indication I can find is the feeble, undeveloped

mind, there is but one remedy that I have found to be of any advantage: *zinc phosphid.* I give it usually in the 2x or 3x trituration, sometimes the 1x, from three to four doses per day, and continue it for months.

The next element in treatment is education. The good that can be accomplished in this direction is only just beginning to be appreciated. I am astounded by results I have seen in some of our institutions during the last five years. I am sorry to be obliged to admit that results, that I have said were absolutely impossible to proximate, have been accomplished. In this connection the question as to home or institutional training confronts the physician at once. The mother knows that she can train and manage her child better than any one else. There is in the families of the middle classes, a sentimental desire to care for the child at home. Among the laboring classes and the poor, we find many who are strongly opposed to any hospital or asylum; on the other hand, many of these classes are perfectly willing to allow the child to be taken care of at a proper institution. The very rich are rather inclined, so far as my own experience goes, to keep these children in seclusion and provide a private attendant or governess.

By far the best plan is the training in an institution, for this class of children. The plea that association with the feeble-minded only is injurious, does not hold in actual experience. In an association with others of nearly the same mentality, everything about the child is brought within the range of its possible comprehension. Comprehension is the all essential in the training. There is not the discouragement of nothing but the, to them, incomprehensible. Much is comprehended by association with other like children, while very little is learned from association with children of ordinary mental endowments. The frictional irritation of brighter children about, is also an element in retarding good moral development. The mother rarely uses anything approaching to even, smooth, firm discipline with this kind of a child, no matter how good the discipline over her other children may be.

A private governess is usually not trained for the management of this particular class of pupils, and even if one is secured, who has the necessary training, the life soon becomes so monotonous that the enthusiasm is lost, and she cannot do the best that can be done for her charge.

As to the best method of training, no specific directions can be given. Each patient must be studied individually, and the training adapted to its peculiar needs.

There are a large number of children who belong to the

feeble-minded class, who are only enough below the average child to learn very slowly and laboriously. They can be trained at home, under a governess, or in the school. Care must, however, be taken to secure teachers who will exercise patience and are willing to lead slowly. Care should also be observed that the child is protected, as far as possible, from the sharp shafts of ridicule so apt to come from playfellows.

CHAPTER VIII.

INSANITY.

INSANITY is not common in children, but is occasionally found. The percentage of the insane increases with age. It is very rare before five years, less so between five and ten, still less from ten to twenty; after the twentieth year it increases quite markedly.

Causes.—The first cause to be considered is heredity, direct and indirect. The proportion having insane parents that are afflicted with the same trouble, or direct heredity, is much greater than in most diseases of the nervous system. The various diseases and habits prone to produce the neuropathic child, or indirect heredity, are fruitful sources of insanity. Traumatism, emotional shocks, or the various diseases that interfere with cerebral nutrition, may cause it. Many cases are the direct result of reflex irritation. In all cases, even in quite small children, the rectum, anus and genitals should be carefully and thoroughly examined. Masturbation is not as common a cause as many authors claim, but there are many cases directly chargeable to it. Neither sex is free from this habit, although boys outnumber the girls by a very large majority. If this habit is taught a very young child by a nurse, an attendant, or by older children, it must and does work great harm, by its profound effect on the only partly formed, sympathetic nervous system. The entire vasomotor system is rendered permanently unstable, and perfect, uniform, well-balanced nutrition of all parts of the body is impossible. If the habit be learned at a later age, say after the tenth year, the harm is not nearly so great; the injury then depends on the frequency of the act, and the duration of the habit. In this connection I must mention a large number of more or less pronounced melancholics where the cause is not masturbation, but the obtaining by the young man of the erroneous information that the habit is necessarily harmful, no matter how little it may have been practiced. Hundreds of these cases present themselves to the physician where, on careful inquiry, it is learned that there has not been a sufficient practice of the habit to do any possible harm; but the constant

brooding over, and looking for symptoms has rendered life unendurable, and produced the symptoms described by various ignorant or unprincipled men as the sure result of the habit.

Training and environment have much to do with the causation of insanity in children, as well as producing a predisposition to it in adult life. Fright is one of the frequent direct causes. The habit so many parents, nurses and older people have of telling children frightful stories, of threatening them with the black man, spooks, etc., etc., cannot be too severely condemned. Children with organic disease of the heart are particularly susceptible to injury from fright.

Many cases are the result of the acute diseases of childhood. Aside from those cerebral diseases which are prone to produce insanity, typhoid fever, diphtheria, scarlet fever and rheumatic fever are the ones most frequently followed by it.

Puberty is a favorite time for the appearance of many diseases. Insanity is no exception. The sexuality of both male and female is so great a part, anatomically and physiologically, of the emotional element, and the emotions in their turn are so important a factor in all mentality, that anything pertaining in any way to it can but have a profound influence. Correct knowledge and a careful guard, mentally and physically, as to sexual matters are therefore important in the training of boys and girls, when approaching puberty.

Symptoms.—A peculiar form of insanity is not at all uncommon in girls about puberty. It commences with a slight actual indigestion, and very soon develops into a pronounced physical indigestion. The patients being fully convinced that they can take no food of any kind into the stomach without great injury, frequently imagine, if of a religious turn, that the taking of food is a sin. The physician must, by a careful examination, satisfy himself thoroughly that there are no physical conditions that can produce the apparent digestive disturbance, and then either send the patient to an institution, or proceed to forcibly feed him through a stomach tube, if necessary. The physician must see personally that a sufficient quantity of good nutrition is introduced into the stomach regularly, and that the patient does not of her own volition, by running the fingers down the throat or otherwise, eject the food. If there be no source of irritation present, no other treatment will be needed.

Insanity in children takes various forms. There may be occasional outbreaks of acute mania with perfectly lucid and healthy intervals. It is much more common, however, to meet cases in which there is a perverted morality. It may be

a pronounced egoism, selfishness or ill-temper; there may be an intense desire to see and do cruel things, either to insects, animals or to persons. There may be a constant tendency to theft, or to some other special moral wrong.

Diagnosis.—The diagnosis must be made by a careful consideration as to whether the child's life and acts are at all in harmony with its environments. That which is insane in a child under certain environments, under others, may be perfectly sane.

Treatment.—If there is not a pronounced heredity or a sufficient emotional shock, there is some physical condition acting as a producing cause. It is the duty of the physician to find this cause. It may take time and a large amount of patience, but it is there and must be discovered.

The treatment of these cases must first be directed to the cure of any possible source or reflex irritation, or the removal of any direct irritation. Cerebral surgery, while not often called for, may in any case be a source of possible relief, and indications for it must be sought in every case.

The urine should be, as in all neurotic cases, analyzed quantitatively. It may be found that a simple chronic uremia is the source of all the trouble, or there may be an exceedingly small percentage of phosphoric acid excreted. The corrections of these will alone cure some cases.

The moral treatment, as it is termed, is of the greatest importance. There should always be firm, even, regular, kindly discipline. The child is unable to control itself; it can only learn self-control by being controlled, and under no circumstances should the child be under the management of any person who has not perfect self-control. Harsh measures are unnecessary and harmful. Asylum treatment, unfortunately, cannot always be obtained for children. Where the parents are able, the child should always be placed in charge of a well-trained and competent nurse. If the parents cannot afford this, the physician must instruct the family again and again as to the smallest details of management, and keep a close, personal watch over the case constantly. It is often possible to find a good, level-headed, motherly woman, without children of her own at home, exceedingly well adapted to the care and management of an insane child, who will take charge, at her own home, for a very moderate compensation.

The remedies I have found useful in the insanities of children are; *aconite, ammonium carb., apis mel., arnica, arsenicum, baryta mur., belladonna, cactus, calcarea carb., calcarea phos., cantharis, capsicum, causticum, chamomilla, cimicifuga, cina, cuprum, ferrum phos., gelsemium, helleborus, hepar, sulph., hyos-*

cyamous, hypericum, ignatia, iodium, kali carb., kali phos., mercurius, moschus, nux vom., nux moschus, opium (very carefully), *psorinum, secale, silicia, stramonium, veratrum album, veratrum viride* and *zinc phos.*

HYSTERIA.

Every physician is called upon to treat cases of hysteria in children, in both boys and girls, previous to puberty. While there are more cases in girls, there is a much greater proportion of boys affected by this disease than is ordinarily realized. Many cases are not diagnosticated, simply because the patient is a boy.

Causes.—Heredity plays an important part in the causation of hysteria. The transmission may be direct from hysteria in the parent, which in this disease is quite frequent, or indirect, one or both parents having been afflicted with some of the diseases, or addicted to habits that are likely to produce neuropathic offspring.

Training and education are prolific causes. If it were possible to have every child judiciously trained and educated, hysteria would be a rare disease. Those predisposed would almost never have it develop, and others would be cured before development. Discipline should begin in very early infancy; a new-born babe may be taught to take its food at regular hours, to go to sleep and remain so at and for regular times, without holding, rocking or carrying. A young babe can learn that, if it cries on account of pain, it is always promptly attended to; and that when it cries from disappointment, or simply because it wants something different, the crying does not result in accomplishing the object. The young child can very soon be taught to realize that, no matter how kind and indulgent a parent may be, repeated asking or teasing never does any good; that, when the parent believes a thing is not good, it never comes; that if a parent thinks a certain thing is for its benefit, it is invariably done. When "Yes, my dear," and "No, my dear," are each spoken with the same tenderness and in the same tone, the mother is teaching and the child is learning. A parent should never lose control of his or her temper in dealing with a child. Under no circumstances should a parent deceive or lie to a child. The habit of telling untruths to a child, of deceiving it in various ways, under various pretexts, and of buying the child to do or refrain from doing certain things, sows the seeds of hysteria in many cases. As the child attains the age of understanding, it should be given reasons for doing or refraining from doing. Where

reason within the comprehension cannot be given, simply say these things will be explained when old enough to understand.

The child should be taught early not to fear. This includes an absolute prohibition of the pernicious habit of telling ghost or other frightening stories, and of endeavoring to obtain obedience through the agency of fright. If the physician has to do anything that is likely to hurt the child, it is much better to tell the child it will hurt, and endeavor to arouse its pride to appear brave, than to lose its confidence by lying to it. If a child loses its confidence in its parents and physician, how can we expect the child to be true?

Education, in matters of book learning, and the development of the mental powers, is a matter to be studied in each individual case. There is no more fruitful source of hysteria in the young, or of hysteria and chronic invalidism in the adult, than a too rapid mental development during the formative period of life. If a child happens to be ever so little brighter than the average—and whose child, unless it be an idiot, is not?—all the friends of the family must know it. Parents tell me almost daily that they do not teach their little children anything, that they try to hold them back; but what is the fact? Every little thing the child learns from association is commented on to every one in the child's presence, and every little couplet must be repeated before every one that calls. In short, the child must show its every accomplishment, and be unduly praised for it. In this way, for the sake of praise and adulation, the child is stimulated to make mental effort when it should be only developing the physical. I do not object to encouragement by praise, but the praise should be for such things as will help a physical development, rather than the mental, except in those cases where the mental is unnaturally slow. The grade of mentality, in independent thinking and reasoning, of the human race would, I believe, be materially elevated if school life began at nine rather than six or seven years of age. Education should have for its prime object comprehension, not simply abstract memory. Make the brain a reasoning organ, not simply a storehouse.

Every child should have a maximum of outdoor life, exercise that tends to develop every muscle in the body, and plenty of it, but avoid heavy straining at any time.

Look to the child's sleeping-room, or to the nursery, and see that it is so located as to get a maximum of sunlight and air. Do not let an architect put these rooms in any part of the house, simply so that it does not interfere with the general symmetry. Do not take the sunniest and airiest room in the

house for a spare room, and relegate the children to any little dark room.

Imitation is the cause of many hysterias. From this cause there occasionally occurs an epidemic of this disease. An epidemic may run through an institution or a school. All of the cases will be of the same kind. Within the same family, one child may imitate an actual disease of some other member, or one member may have some form of hysteria, and a child afflicted, in the same form, by imitation.

Rapid or severe changes in temperature seems to act as a cause at times.

Memory seems to play an important rôle. A child sees or hears something that makes a profound impression, or has something happen to it, possibly an accident, the thought of which remaining constantly in the mind, may be the direct cause of hysteria months or years after. Many cases of supposed rabies are hysterical and belong to this class. There is in every person of any mental endowment, in addition to the ordinary memory, or that which enables us to recall facts or things, an unconscious memory; that is, many things are stored away, somewhere in the deeper recesses of the brain, of which we are entirely unconscious; these things exert a far wider, deeper, profounder influence in our lives than we can possibly appreciate. This memory will, as has been clearly proved in many cases, be the cause of a hysteria.

Any reflex irritation may be the cause of a hysteria. If we exclude those cases from direct heredity, and those due to faulty training and education, there will be very few cases in which some form of reflex irritation will not be found to be an important element in the direct causation. So far as my own experience is concerned, the chief reflex causes have been in the eye, the digestive tract and the genitals.

I have, however, found every possible reflex irritation to be the cause of hysteria. It is not infrequent to have hysteria follow or appear during the convalescence from acute inflammatory or infectious diseases. There seems to be a general impression that the hysteric is necessarily of a yielding, weak nature; the contrary I believe to be true. The intellectual type, of fine sensibilities, those of tenacious and positive opinions, and the energetic and impulsive people, are most susceptible to this disease. Another class who are frequently subject to hysteria are those of devout nature. Chronic uremia is a frequent cause.

Symptoms.—An attempt to enumerate the symptoms of hysteria would mean the mention of nearly every symptom of every known disease. There may be convulsions, paralysis,

contracture, chorea, tremor, ataxy, anesthesia, hyperesthesia, paresthesia of any character, pain of all possible shades and types, almost any form of mental aberration, and so on through the list.

At times the symptoms in their totality will so closely resemble various diseases as to render differentiation quite difficult, occasionally, indeed, impossible for weeks. Blindness, deafness and mutism are not infrequent in children. Abnormal excretions, particularly the urinary, are fairly common; many cases of nocturnal disturbances are hysterical. There may be an absolute suppression of urine, or in the cases appearing near puberty, there may be so much shrewdness in disposing of the urine that the attendant finds great difficulty in detecting the passage of any urine, and for a time is convinced of an entire suppression.

Even quite young children will show a great degree of shrewdness in deceiving those about. In some instances the deceptions are intentional, and for the deliberate purpose of obtaining an object; but in the true hysteria, there is an irresistible impulse combined with a degree of self-deception. There is always a distinct effort at attracting attention. This is often skillfully cloaked, but is always discoverable. Hysterical symptoms are primarily for the audience, not for the patient.

It occasionally assumes the form of a theriomimicry — that is, a mimicking of certain animals, either the sounds made by them or their actions. If a hysterical child bites, it is more likely to bite some other person, but occasionally they bite themselves quite seriously.

Night terrors may be classed among the nocturnal hysterias.

We have hysterical talipes of various forms, also hysterical hip-joint disease, and spinal curvature.

We find hysterical anethesias, where the child can be burned or cut without the least flinching.

Persistent somnambulism is claimed by some very high authorities to be a form of hysteria. We recognize, also, a purely hysterical fever; the rise in temperature and concomitant symptoms may occur only at night, or during the day, lasting for a short time only, or the fever may last several days. The increased rapidity of the pulse and rise in temperature may be slight. In some cases the pulse will be uncountable, and the temperature may rise to 110° Fahr. without indicating danger.

Catalepsy, ecstasy and trance must, at present, be considered as forms of hysteria. These conditions are not common under the age of puberty, but are occasionally met.

Epileptic or convulsive seizures are frequently hysterical.

Hystero-epilepsy is now fully recognized as a distinct entity, entirely separate from true epilepsy or from organic convulsive seizure. It is not always an easy matter to differentiate the hysterical from the true convulsive seizures. In not a few true epilepsies or convulsive attacks of reflex origin, hysterical convulsions occur as frequently as the true convulsions.

Diagnosis.—The diagnosis is of the greatest importance, as the prognosis will, in many instances, depend on learning early the nature of the disease. Very many chronic invalids, who have the sick habit so fully formed that a cure is absolutely impossible, might have been easily and quickly cured had the nature of the disease been discovered soon after its first manifestation. An opinion by a physician of some serious organic disorder, especially if confirmed by others, may so thoroughly imbue the inner consciousness that no influence can eradicate it.

The physician will require all keenness of perception, all of his shrewdness as well as judgment, to be at all times certain of his ground. He must realize that children, especially of the class subject to hysteria, have keen ears and sharp eyes, are close observers, have quick perceptions, and bright, shrewd intellects. He should, therefore, be very careful as to what he says or does in their presence or he may be thwarted in the study of the case.

The diagnosis must be made by exclusion. It is my own rule to first look for disease other than hysteria. In fact, it is a universal rule with me, whenever I get an early impression as to the diagnosis in any case, to undertake to prove that impression wrong. There is no greater enemy to success from a purely professional point than instantaneous or intuitive diagnosis. The physician who can tell what is the matter as soon as he looks at a patient, is, in a large measure, responsible for the great distrust of medical skill existing at this time in the minds of the public.

In the psychical cases, the environments must be considered; for instance, a child living among, and constantly associating with criminals, is not necessarily insane or hysterical, because it is very deceitful, shrewd, and generally immoral.

In differentiating from any organic disease, it will always be found that some essential feature of the organic disease is absent; it may be in the mode of onset, previous history, the course, or the present symptoms. To determine this requires careful, close physical examination, and a knowledge of those things absolutely essential to the disease that is resembled. Thus, in a hystero-epileptic attack, there is not that form of muscle action indicative of absolute loss of volition, or of consciousness. Close observation will show that the various

contractions are, at least in part, directed by the mind of the patient. In the hysterical hip-joint disease, the position of the foot will not be right; the pain on moving the joint in the socket, will not be produced under the manipulations that must produce pain if the joint is actually the seat of the disease.

The differentiation between hysterical and other convulsive attacks is sometimes exceedingly difficult. The hysterical attack may resemble the Jacksonian epilepsy so closely as to make a diagnosis impossible for weeks, or even months. There is no doubt that a certain percentage of the cures, following operations for the Jacksonian, are in purely hysterical cases. In the hysterical, there is no collateral evidence of localized lesions, nothing in the history to make a localized cerebral disorder probable. In hysterical attacks, each attack is usually the result of some emotional disturbance. There is apt to be palpitation, malaise, choking, or bilateral-foot aura. The onset is apt to be gradual; the scream likely to be during the course of the convulsion. The convulsive actions are usually in the form of rigidity or struggling and throwing the limbs and head about. The biting is commonly of the lips, hands, or more often of other people and things. Micturition and defecation almost never occur. Talking is quite frequent. The duration is frequently of for half an hour, or for several hours. The need of restraint seems to be more for the purpose of controlling violence than of preventing accident. The termination may be spontaneous or artificial.

Prognosis.—The prognosis in hysteria in children is, or rather may be, favorable in every case, where it is possible to secure proper treatment. There are likely to be recurrences from time to time.

Treatment.—The treatment may be classed as preventive and curative. The preventive treatment, I think, is sufficiently indicated under the causes. The nervous child should always be kept from emotional influences as much as possible. The first step in curative treatment should always depend on the thorough and complete examination that has been made. Any and every possible source or reflex irritation should be cured or removed; following this, discipline must be maintained, not harsh, but firm and steady. The right kind of sympathy is difficult to obtain. There is in nearly every hysteric, as a motive for the symptoms, a craving for sympathy. In a very large number of cases, I am sure, the patient is not conscious of this. In many cases the motive power is the procuring of a desired object, but these cases are in the minority, I believe. How to secure sympathy that will not feed this abnormal

craving, and at the same time will not cause the patient to feel that no one has any interest in him or her, is a matter for careful consideration and tact in each individual case. In many instances it is absolutely necessary, even with quite small children, to take them from home into new environments, and sometimes even away from their own family, and place them under the care of entire strangers.

The confidence of the patient must be secured. This is often a matter of some considerable time, and it can never be accomplished by deceiving the patient, nor will it usually come from positive statements alone. The physician must use the psychical force of which he is possessed, to influence and mold the inner consciousness and thought of the patient. This suggests hypnotism, a subject I do not propose to discuss here. I will simply say that many hysterias have been cured by it.

The inner consciousness of the patient must in some way be convinced that improvement is going on; telling a patient of this kind that it is all imagination is harmful, not beneficial. The physician must recognize and feel that hysteria is a disease, as much so as any other ailment, and that the cure requires study and judgment, as well as tact.

General massage, and if the patient is thin or anemics, oil of some kind in conjunction, will be useful in many cases.

Electricity is often a valuable agent. Central galvanism or general faradism are usually the best, but local treatment to specially affected parts may be valuable.

Baths of various kinds, hot or cold, may be of service in regulating the circulation, may assist in elimination and in building the tissues, and in this way improve the nutrition. Great caution must be used not to frighten children in giving the baths, or other forms of treatment. Douches, shower baths, and salt baths may be of service.

Much has been said of hysterogenic points in hystero-epilepsy. In my experience, prompt cessation of a fit has occasionally followed from pressure on the testicles, the ovaries, or the inframammary regions, or over the spine, but many purely hysterical cases are not relieved at all by this measure.

In many cases where an aura travels up an arm or leg, relief is found by pressure over a nerve trunk with the thumb or a knotted ligature before the aura has passed that point. Hypodermic injections of water, or medicated, are often beneficial.

It will frequently be found that it is better not to give too much attention to apparent local troubles, rather make the treatment general. The child's mind should be directed into

other channels, rather than allowed to dwell on itself and its ailments.

It will be, sometimes advisable to give a new direction to the study, reading and amusement, even where there seems to be no good reason other than that the patient is anxious to pursue its own selected line.

Remedies in hysteria are to be selected with great care, and can be given with great confidence, but not if the general management of the case is neglected.

The bromides and other narcotics and hypnotics should never be used, they are positively harmful. The old fashioned drug, asafetida, in crude doses, may in some instances be of great service. It would be impossible to give anything approaching a systematic guide, to the selection of the indicated remedy in the space at my disposal. There is scarcely a remedy in the *materia medica* that may not be indicated. The remedies that have been most commonly useful in my hands in the hysterias of children are: *aconite, ammonium carb., apis mel., asafetida, belladonna, calcaria carb., calcaria phos., cantharis, causticum, chamomilla, cicuta, conium, gelsemium, hyoscyamus, ignatia kali phos., lycopodium, magnesia phos., moschus, nox moschata, nux vom., platinum, sanguinaria, sticta pulmonaria, stramonium, sulphur and zincum phos.*

CHAPTER IX.

DISORDERS OF SLEEP.

THE child must sleep plentifully if it is to grow and develop as it should. During the first three months it should sleep from sixteen to eighteen hours every day. From this to two years of age from fourteen to sixteen hours, and then, to ten years of age, from ten to twelve hours. Insistence on regular, quiet sleep, is of the greatest importance.

The habit, so common, of taking children to places of amusement, or out visiting in the evening is very bad. The digestion and nutrition cannot but be interfered with. The child should always sleep alone and should be, early, taught to go to bed and to sleep alone in spite of light or ordinary noises. If proper care is taken a child will not waken from any slight cause. The perfectly healthy, well-trained child will sleep in spite of unfavorable environments. The sleeping room should always have the greatest possible amount of sun during the day and plenty of fresh air at night. If a child does not sleep soundly and well there is something wrong either with its physical condition or its environments. I am fully satisfied the wrong is more frequently in the parents or nurses, than any where else.

A parent will claim to love a child and at the same time, solely for self-gratification and self-pride, will, on every possible occasion show off all the child's accomplishments to every one with whom it comes in contact. Mothers will waken a month old babe to show some friend what pretty eyes it has. Simply because they want to attend a party or go somewhere, for their own pleasure, parents will take the child along because they do not want to remain at home and cannot leave the child alone, and thus break up the regular, habitual hours of sleep. Other parents will give the entire charge of the child to a hired attendant, not taking any particular pains to know whether such attendant is competent or not.

Regularity of hours in going to sleep and waking are of the first importance. Habit is a great master. If a child is kept fretted and worried, or excited in any way, the greater part of

the day, it cannot get a good restful sleep, such as is essential to its well being at night.

If the environments are satisfactory and sleep is interfered with, the physician must find some cause, for a cause always exists other than perversity on the part of the child. Various diseases interfere with sleep. In such instances it is simply an accompaniment and is to be considered in the treatment of that disease.

Restless, fitful sleep, or wakefulness is probably more frequently due to digestive disturbances than to any other cause. This may be the result of some immediate indiscretion in diet, or to regular, continued indiscretion.

Constipation is not at all infrequent in children, and often causes derangement of sleep.

Various reflex irritations will derange the circulation, interfere with normal digestion and nutrition, or produce a general nervousness, and, while not sufficient to produce the more marked disorders, will interfere with the sleep. In many children there is a condition that is best described by the term cerebral irritation, a condition in which, without any actual or regular derangement of the cerebral circulation, where no nameable disease entity can be discovered, the child is unduly excitable, nervous, peevish, irritable, has more or less headache, and is a poor sleeper, is subject to unpleasant dreams, somnambulism, night terrors, or even a mild form of hystero-epilepsy. It would not be justifible to diagnosticate cerebral irritation as an entity unless the symptoms have existed for some considerable time. In these cases there is always a findable cause, either in the training, the environments, the digestive tract, or in some reflex irritation.

In all cases make a thorough and complete examination. Various defects in the eye, it must be remembered, are always to be thought of when reflex irritations are mentioned.

Treatment.—In the treatment of these cases, first see that the psychical and physical environments are corrected, so far as possible, then correct all possible sources of reflex irritation and then prescribe your remedies.

In selecting a remedy take into consideration all the symptoms presented, not those of sleep alone. Never under any circumstances use any hypnotic or narcotic to force sleep. Always bear in mind that opium in any form is not well borne by young children, and is always dangerous.

The remedies that have, in my hands been most frequently indicated are: *aconite, belladonna, calcaria carb., chamomilla, coffea cruda, cypripedium, cimicifuga, gelsemium, hyoscyamus, lycopodium, opium 6x to 30c, nux vom.*, and *stramonium.*

NIGHT TERRORS deserve special mention. It is important in that it indicates, if recurring at all frequently, a marked nervous irritability that may lead to more serious disturbance. It has, and properly so, been considered as belonging to the nocturnal hysterias, and yet as it seems often to be the only manifestation of trouble, it is accorded a distinct recognition. It is in some cases, without doubt, a precursor of epilepsy or of recurrent convulsions, not frequently enough, however, to warrant a prediction of the graver condition from this symptom alone.

It is occasionally an accompaniment of cerebral organic disease. It may be the result of reflex irritation, or of emotional excitement. It is probably more frequently the result of digestive or intestinal disturbance.

The anemic, scrofulous, tubercular and rachitic child is more likely to be subject to these attacks than the strong and robust. The child of fine, sensitive, nervous organization, and the very excitable and enthusiastic child, even if fairly strong and well-nourished, may be considered as predisposed. Obstruction in the nasal passages from catarrh or foreign growths, obstructions in the throat from foreign growths, or enlarged tonsils, are quite frequently causes. They usually begin between the first and second dentition, very rarely later than the eighth year.

The attack is more likely to come on early in the night, within three or four hours after going to sleep. The child wakens screaming and showing every evidence of being very much frightened, may jump up in, or out of, the bed, and try to fight off some imaginary thing, or throw the hands around wildly in all directions. At times the child will indicate, by word or action, the special cause for fright, but more frequently it is simply a general fright. The child evidently is not conscious of its surroundings, does not know parents or friends that may be with it. In a short time usually from fifteen to twenty minutes, it may begin to recognize persons and objects about, gradually becomes calm, and then goes to sleep and is quiet until morning. There are, sometimes more than one attack in the night, but this is not frequent. The next morning as a rule there is no recollection of the occurrence, occasionally there is, although there is a great disinclination to talk about it or to hear it referred to.

The treatment must be first directed to securing good, healthy surroundings and general quieting influences. Any and all possible sources of reflex irritation should be removed promptly. Special attention to the digestive tract should be given. I believe more cases have recovered while under my care, from the administration of pepsin than from any other

single line of treatment. It will be frequently necessary to circumcise or to remove the tonsils, or some foreign growth from the nose or throat. In the anemic cases thorough nourishment is the essential element of treatment.

My chief remedies, for the night terrors themselves, are: *belladonna*, *hyoscyamus*, *nux vom.*, *gelsemium*, *calcaria carb.*, *kali phos.*, *cicuta virosa*, *ignatia*, *santonin* and *stramomium*. I never use the bromides or opiates for these cases.

CHAPTER X.

HEADACHES IN CHILDREN.

CHILDREN never have headache unless something is the matter with them. They frequently complain of headache in the way of imitation or feign headache for the purpose of obtaining sympathy, or their own way. It requires very little observation and acumen to detect these cases.

Headache may be an accompaniment of nearly any disease, acute or chronic. There is a distinct nervous headache, known as a bilious headache, as megrim or migraine. This form is recurrent at regular or irregular intervals, and without apparent immediate cause. The pain is very severe, may be present on waking in the morning, grow steadily worse for a time, and then gradually or suddenly subside, very frequently during sleep. It may come on at any time of day, gradually grow more severe, and then gradually or suddenly subside. It may be unilateral or bilateral. It may appear first on one side and then on the opposite side, or it may sometimes occur on one side in one attack and on the opposite side in another attack. Occasionally the attacks will alternate on the opposite sides of the head regularly. In a large proportion of the cases nausea and vomiting will be associated with the pain at some time during the attack. In some instances the pain subsides instantly whenever emesis occurs. In these cases I can see no reason why emesis should not be artificially produced promptly, but this is only justifiable in the few cases of this special type.

Disorders of digestion, or any other source of reflex irritation may cause a tendency to frequent and more or less severe headache.

The child that is brought up in an unnatural, forced atmosphere, or is kept too constantly in doors, or is kept too clean, who does not get sufficient good, pure out-door air and physical exercise, who is a constant recipient of don'ts, or who lives in an irritable, excitable atmosphere, is likely to have more or less headache.

Kindergartens and early school life may, by causing too close mental activity in an unprepared brain, be the cause of more or less constant headache. In older children too close confinement to study is a common source of headache.

In this connection the eyes must be specially mentioned, as they are the cause of many of the nervous and of all other forms of headache. Uremic poisoning is often the cause of either the severer or milder form.

When called to a case in which headache is the one main symptom, and is of frequent occurrence, examine carefully till you find the cause and then treat that. If, after diligent and intelligent search, you are unable to find any cause there is but one road to a cure, and while it requires very close study, and time it will prove very satisfactory. Take your *materia medica* and find the indicated remedy. I purposely refrain from mentioning any special remedies, in this connection, for the reason that any predilection toward special headache remedies will interfere more with success than it will help. My own plan is to go to my *materia medica*, in each case, as nearly as possible without prejudice in favor of any remedy or group of remedies.

CHAPTER XI.

CONGESTION OF THE BRAIN.

CONGESTION of the brain is a condition in which there is an increased quantity of blood in the brain capillaries. It is a condition much more frequently met with in children than in adults. This is easily accounted for by the greater susceptibility of the child to both mental and physical impressions, and consequent greater liability to circulatory disturbances.

Congestion of the brain may be a primary disturbance, but is more often an accompaniment to other diseases. This is especially true of children, for disorders, which in the adult produce no appreciable brain disturbances, may cause grave and alarming conditions in the child. As stated, congestion of the brain is an increase in the amount of blood in the brain capillaries, and since this capillary hyperemia is the cause of the functional disturbance of the brain, it constitutes the chief pathological feature of cerebral congestion.

Congestion of the brain may be active or passive. It is active when, through arterial distention or dilatation, brought about by causes acting directly upon the brain, or from those operating directly upon the heart, arterial blood is rapidly flowing through the capillaries. It is passive when, by some obstruction in the course of the circulation, or when, on account of a feebly acting heart, blood is permitted to move but slowly through the capillaries, and consequently is largely venous.

The capillaries are not visible to the naked eye, but viewed with the microscope, are seen to be much distended, often to double their natural size. There is a deeper tint to the gray substance, and an increase in the number and size of red points on section of the white matter. In *active congestion*, there is an excess of arterial blood in the brain and its membranes, and the arteries are distended and filled to their minutest branches. In *passive congestion*, the veins and sinuses are engorged with blood. The vessels in the membranes in *active congestion* are bright red; in *passive congestion*, they are dark, or of a bluish tint. In either condition, if the congestion continues long enough, other changes take place. If the capillary distention is great, there may be rupture and extravasation over larger or

smaller areas, or the distention may be relieved by exudation of serum into the pia mater.

Symptoms.—The symptoms of active congestion of the brain are great dryness of, and heat in the head, throbbing of the carotids, restlessness and peevishness, especially on being disturbed, and jerking and twitching of the limbs. There will be severe throbbing pain in the head, and if the fontanels are still open, they will be distended and throb visibly. In passive congestion, many of the symptoms are the same as those of the active form. The irritability on being disturbed, the stupor, and the twitching are common to both conditions. In the passive form, there are sometimes marked general convulsions. In passive congestion, the heat of the surface of the body, the flushed face and the injected eyes are not present. The surface may even be cool or bathed in considerable perspiration. The throbbing of the fontanels is markedly absent, and the distention of the same is not noticeable until later, when serious effusion has taken place.

Etiology.—The causes that produce active congestion of the brain in children are numerous. The circulation of the sensitive, undeveloped brain of infancy and childhood is easily disturbed. Strong mental emotions, sudden fright, great grief, excessive delight, and indiscretions or irregularity of diet may operate as causes of cerebral congestion in children. Heredity plays an important part in predisposing children to cerebral congestion, more particularly the active form. Any form of dissipation, hysteria, insanity, and such diseases as tend to produce neuropathic children, tubercular diseases especially, will predispose the child to cerebral congestion.

Children with active, precocious minds and large brains, are strongly inclined to cerebral congestion on slight provocation. Rapid or difficult dentition may also predispose to this trouble.

The various inflammatory diseases and febrile affections, especially in their first stages, are often attended by severe congestion of the brain. The elevation of the anterior fontanel, so markedly characteristic of active congestion of the brain in the infant, is often unusually prominent in the first stages of fevers and inflammations, and in such cases cerebral hyperemia is obviously present. This fact leads to the natural inference that in the first stages of the febrile and inflammatory affections, when brain symptoms are present, there is often an actual, active cerebral congestion, and not merely a functional disturbance of the brain through sympathetic nervous connection. The acute inflammations of the mucous membranes are most likely to be attended by cerebral congestion. Severe bron-

chitis, colitis, enterocolitis, and dysentery, with a sudden onset and intense febrile excitement, are frequently accompanied in this first stage by active congestion of the brain. Extra activity of the heart from any cause, functional or organic, may be a cause of active congestion. Traumatic violence, as a blow or a fall upon the head, must not be lost sight of as a cause in this affection, nor the exposure to excessive heat, the former being a frequent cause, and the latter occasionally explaining an otherwise unaccountable origin.

The causes of passive congestion differ very greatly from those of the active form. It is due to an impediment in the return of blood from the brain, or to a weak and slow action of the heart. Prolonged and difficult labor will at times result in the birth of an infant presenting the most marked symptoms of passive congestion of the brain, such as stupor, twitching of the limbs, and even convulsions. This condition may gradually disappear, unless hemorrhage be coincident with the congestion.

One of the most frequent causes is found in strumous or tubercular children, where enlarged glands, by pressure on vena innominata, or descending vena cava, obstruct the return of blood from the brain. If a child suffering with advanced tuberculosis of the bronchial or pulmonary type exhibits brain symptoms, such as rolling of the head, boring the head into the pillow, with possibly slight irritability of the stomach, passive congestion is the probable cerebral condition, and in such cases extremely enlarged bronchial glands pressing upon the abovementioned vessels have frequently been revealed by the autopsy. Whooping cough, which so often produces extravasation into the conjunctiva, and even under the tissues surrounding the eye, may sufficiently interfere with the return circulation from the brain as to cause passive hyperemia. Malarial diseases, especially the intermittent and remittent types, where the cold stage is profound and prolonged, may be attended by serious, and occasionally fatal congestion of the brain and its membranes. School children who are exceedingly studious, and great readers, and who take comparatively little physical exercise, are apt to suffer from passive congestion of the brain. If the child hangs with the head down for any considerable time, it will have a passive cerebral hyperemia, which is occasionally serious. It is occasionally the result of an accidental pressure about the neck. Foul air or noxious gases are often productive of this form of congestion. Asphyxiation is nearly always accompanied by passive congestion. Anything that interferes with the free action of the lungs and oxygenation of the blood, may result in passive congestion. Rheumatism or other

diseases interfering with the heart's action so as to diminish its force, may cause passive congestion. Active or passive congestion may either of them be the result of toxic influences. Many drugs affect the cerebral circulation.

Prognosis.—The cause operating to produce the congestion, the intensity of the hyperemia, and the promptness with which the proper treatment is instituted, largely govern the prognosis in this condition. The cases most frequently met, where the causes are such as excitement, fatigue, overheating, or indiscretion in diet, readily respond to prompt and proper treatment. Where the condition is secondary to other acute diseases or constitutional disturbances, the prognosis of the brain trouble depends upon that of the producing disease.

The prognosis in passive congestion, depending upon obstruction to the circulation of the brain, will be governed by the possibility of the removal of the obstruction. In those cases resulting from continuous mental activity, the prognosis may be always favorable. In those cases resulting from foul air and noxious gases, if coma is not present, the prognosis is favorable. When caused by lung or heart conditions, the prognosis will be that of those conditions. Cerebral congestions resulting from overheating, while often cured, are always to be considered serious.

If congestion of the brain is not recognized and controlled early, it is likely to pass rapidly on to a more serious condition of extravasation or effusion, with concomitant coma and possible death.

Treatment.—The principal object to be accomplished in the treatment of cerebral congestion is the diminution of the amount of blood in the encephalon. The condition of the bowels should be inquired into, and, if necessary, a full enema of warm water should be given, or even a brisk saline laxative. Stimulating applications should be made to the feet, such as mustard or the hot foot-bath. The child's feet and legs may be immersed to the hips in hot water containing mustard, always using at the same time cold applications to the head, but never ice. If you have reason to suspect the presence of undigested food in the stomach, do not hesitate to give a quickly acting emetic. The application of a moderately active mustard draught to the cervical spine may follow the foregoing measures with advantage, still continuing the cold applications to the head. These are measures accessory to drug therapeutics, which are of the greatest importance, and should be made use of as early in the case as possible. The head and shoulders of the child should be slightly elevated, and perfect quiet maintained in all its surroundings. Never allow the child to be

carried about, or rocked in a cradle, or jolted or swayed back and forth in the lap of the attendant.

The medicines most often indicated in the early stages of this affection, and upon which the greatest reliance may be placed, are comparatively few. *Aconite, belladonna, gelsemium,* and *veratrum viride* may be said to constitute our chief and almost whole drug resource in the early treatment of this disease.

Aconite.—Early in the case, great heat, dry skin; full, strong pulse; high temperature; anxiety and restlessness.

Belladonna.—Intense restlessness; fierce delirium or incoherent muttering; red, bloated face; injected conjunctiva; great sensitiveness to light and noise; throbbing of the carotids and temporal vessels. A perfect picture of extremely active congestion.

Gelsemium.—Heaviness of the head; dullness of mind and perception. Child becomes drowsy, comatose and convulsive.

Veratrum viride.—Great rapidity of the pulse is the leading indication for this drug, and especially if with this symptom convulsions threaten or are present. It will be more often indicated in cerebral congestion than any or all other remedies. It should be given low and in frequently repeated doses until some diminution in the pulse rate is observed, when the size and frequency of the dose may be diminished. I consider it of great importance when *veratrum viride* is being given in appreciable doses, that the physician give it himself, and with the finger on the pulse of the patient, carefully watch its effect until the desired result is obtained, and the dose is reduced to a safer limit.

The causes operating to produce the congestion will often govern the selection of the drug as much as the symptoms presented. Those cases due to gastric or enteric disturbances will require such remedies as *bryonia, nux vomica, mercurius, pulsatilla, arsenicum,* or *calcarea carb.* If caused by overheating, *belladonna, glonoin* or *veratrum vir.*

When the result of a fall, blow, or concussion, *arnica, belladonna, bryonia, hypericum.*

If due to excitement, *aconite, belladonna, ignatia, chamomilla,* or perhaps *bryonia* or *nux vomica.*

When complicating dentition, *aconite, chamomilla* or *gelsemium.*

The disposition to congestion of the brain is often controlled by such remedies as *calcarea, hepar, silicia* and *sulphur.*

The remedy *par excellence* for school children who show a tendency to brain trouble, is *calcarea phos.*

When congestion is due to a feebly acting heart, the drugs

which will increase the force of the heart, in connection with such as have a general tonic action, will be useful. Among them are *digitalis*, *glonoin*, *hydrocyanic acid*, *cactus* and *strychnia*.

In those cases of passive congestion, where the pressure of growths or enlarged glands operate as causes of circulatory obstruction, help must be found, if at all, through the drugs known to have the power of absorbing such products, or through surgical measures.

If congestion of the brain is not relieved promptly, especially in acute attacks, effusion or extravasation will take place, and other pathological conditions supervene, after which congestion is no longer the prominent condition, and the disease would probably be called by another name.

CHAPTER XII.

MENINGITIS.

Definition.—Meningitis is an inflammation of the covering of the brain—the pia mater—which may be general or limited to the convexity of the brain or to its base. It may be traumatic in its origin, idiopathic or symptomatic; simple or tubercular. Until early in the present century, all inflammations of the brain, both acute and chronic, were included in the general term hydrocephalus. The latter term is now restricted to those cases of chronic character, in which there is a gradual effusion of serous fluid into the ventricles of the brain, causing them to become more or less distended and the head enlarged—a true dropsy of the brain.

A condition called "*spurious hydrocephalus*" is met with not infrequently in connection with the wasting diseases of childhood, especially during the later stages of inflammatory diarrhea.

The symptoms of this form of hydrocephalus are those of great exhaustion, pinched features, livid complexion, drowsiness, which gradually deepens into coma, rapid intermittent pulse, irregular, sighing respiration, subnormal temperature, and sunken fontanel.

Simple Meningitis.—This form of meningeal inflammation may be divided, according to its causes, into idiopathic and traumatic—the former being much more common than the latter. All forms of meningitis are more common in childhood than in adult life. It is much more frequently met with among males than among females. It is apt to occur in the course of any and all the acute febrile diseases, such as measles, scarlatina, and rheumatic fever. It may occur as a complication in erysipelas of the head and face, or in the course of pneumonia or pleuro-pneumonia.

It is common among cachectic subjects, independently of previous acute affections. Diseases of the ear and nose are quite prone to extend their baneful influences to the brain and eventuate in acute simple meningitis. Excessive mental activity at school is undoubtedly responsible for many cases, as is prolonged exposure to the direct rays of the sun.

The traumatic variety is met with after injuries of the head, as from blows, even when the blows have not been severe enough to cause an external wound or fracture of any of the bones of the skull.

Simple idiopathic meningitis is usually due to an extension of some inflammatory process remote from the brain, and is therefore, a secondary disease, the traumatic variety alone being primary.

In *post-mortem* examinations of children dead of meningitis, the brain is usually found covered with a layer of yellowish or green pus, and the same kind of substance may be found also in the ventricles. For this reason the disease is frequently known as "suppurative meningitis."

In prolonged cases—it sometimes lasts a month—the pus may be found to extend down about the cord in quantity, where it will mostly appear on the posterior aspect, having evidently gravitated to that position. There is practically no difference between meningitis of the brain and that of the cord.

The membrane affected is one and the same, and disease of the membranes of the brain run with perfect facility along those of the cord. There is, therefore, no occasion for a separate consideration of that form of meningitis in which both brain and cord are involved, and known as "cerebro-spinal meningitis."

Symptoms.—The symptoms of meningitis are often indefinite. Hebetude or coma will not infrequently occur in children, seemingly of the most alarming nature, but which will disappear in a day or two, being apparently a reflex of some indigestion or vasomotor condition. Then again the acute febrile affections of children, such as the pulmonary, enteric and miasmatic diseases, and the exanthemata will produce grave conditions of hebetude, coma or delirium, and it will often be a matter of great nicety to determine how much is reflex from the primary disease, and how much may be due to actual implication of the cerebrum or its membranes.

The symptoms are apt to vary somewhat with the age of the child. In young infants there is a tendency to collapse, restlessness, swelling of the head, enlargement of the veins of the surface, and retraction of the neck.

In older children there is apt to be more fever and more definite evidences of meningitis in headache, vomiting, irregularity of pulse, and squint.

Whatever the age, the face is pale and pinched, the head is retracted, the bowels confined and food is taken badly. Among the early symptoms cephalalgia is usually pronounced, and is of an intermittent character. This cephalalgia may be general or

localized in some particular region of the head, and if the child is old enough to describe his sensations, it is complained of again and again; if too young to talk, the pain is indicated by cries, by application of the hands to the head, or by other unmistakable signs. The intensity of the pain in the head varies greatly in different subjects, and in some cases it may be nearly absent, or it may come on at a later date. Insomnia is generally present from the commencement of the attack. Delirium of various grades of intensity is usually present, sometimes of a mild and quiet type, mere loquaciousness; at others it is furious, and attended with screams and kicks.

In some cases delirium is replaced by a semi-comatose condition which gradually deepens into actual coma. Nausea and vomiting, and also convulsions, either general or local, may be met with in the early stages of the disease, and also as initial symptoms.

There is often intolerance of light and loud sounds, more or less general pyrexia, with heat of head, rapid pulse and irregular respiration. The tongue is furred, and often thickly coated. The bowels are constipated.

As the disease progresses we are pretty sure to have convulsions or spasms, often of the tonic order, affecting the muscles of the head and neck, which are frequently drawn backwards, or one or both arms; or a condition of trismus may exist. The eyes are sometimes drawn upwards, and occasionally inwards. The pupils may be at first contracted, but later are widely dilated and insensitive. Inequality of the pupils is quite common. The conjunctiva are often injected. The abdomen is retracted and hollow. Difficulty of deglutition is frequently well marked toward the end. As soon as the stupor is pronounced, there is incontinence of feces and urine. The temperature is at times high, but subject to fluctuations—marked irregularity of temperature being quite typical. The skin is generally hot and dry, though occasionally there may be copious sweats.

Prognosis.—A large percentage of deaths take place within the first week of acute meningitis; a much smaller number survive till the end of the second week, while a few exceptional cases do not succumb till into the fourth week. The disease is one of great gravity; and while it is difficult to say just what the percentage of recoveries is, it probably does not exceed ten in a hundred cases.

Diagnosis.—The differentiation of idiopathic from tubercular meningitis is attended usually with much difficulty.

The treatment of both varieties, however, is so similar, that an accurate diagnosis is not altogether essential.

The fact that an inflammation of the meninges is present or

threatened, is a matter for the gravest consideration. A few points will aid in reaching a decision as to which form we are dealing with.

In the first place, idiopathic meningitis is far more rare than tubercular, the latter being, unfortunately, all too common. Delirium is rarely so violent in tubercular as it may be in simple meningitis.

Retraction of the head is also neither so marked nor so frequent in the tubercular variety.

The temperature is usually higher in simple than in tubercular meningitis—rarely rising over 103° Fahr. in the latter form. In tubercular meningitis, the two sexes fall victims in about equal numbers, while in simple meningitis two out of three cases are likely to be males. In children and infants retraction of the neck should always excite apprehension, and any rigidity of the neck or pain in movement. The other signs of meningitis must then be sought for, such as rigidity of muscles elsewhere, evidence of pain in the head, swelling of the head, distention of the veins of the scalp, vomiting without apparent cause, retraction of the abdomen, constipation, irregularity of pulse, sighing respiration, a tendency to reddening of the skin after slight friction (*tache cérébrale*), and the state of the fundus oculi.

The previous state of health should be inquired into—the prior existence of measles, scarlet fever, sore throat, earache, etc. In meningitis no one symptom is infallible, and the whole group of symptoms will often leave us in temporary doubt. The most reliable, however, are retracted head, fever, causeless vomiting, irregularity of pulse, and muscular rigidity or weakness.

Treatment.—To avoid needless repetition, the reader is referred for treatment to the next section on Tubercular Meningitis, where the whole subject of remedial measures will be discussed.

TUBERCULAR MENINGITIS.—Tubercular or "granular" meningitis differs from simple or idiopathic meningitis in having its remote origin in a general tuberculous condition of the subject—in other words, it is tuberculosis, plus meningeal inflammation. Tubercular meningitis is not an independent affection, but constitutes one important phase of "a many-sided general disease commonly known as acute tuberculosis, and marked anatomically by the presence of 'gray granulations' within the the thorax and abdomen, as well as in the membranes of the brain. In certain rare cases death takes place from granular meningitis before the anatomical marks of the general disease

have had time to develop within the chest or abdomen. More frequently, however, the manifestations of the general disease are already developed in one or other, or in both of these situations, at the time that they reveal themselves also on the side of the brain. In the latter, and by far the most common class of cases, the symptoms met with will be in part those of the general affection, and in part (but in a predominant degree) those due to that implication of the brain and its membranes with which we are specially concerned." See preceding section on Idiopathic Meningitis.

Etiology.—From what has just been said, it will be seen that the etiology of tubercular meningitis resolves itself into the etiology of the general disease—acute tuberculosis—of which it forms a part, and the reader is referred to the chapter on this affection, where the subject of etiology is fully discussed.

Symptoms.—By some authors the disease we are now considering is divided into different stages, each with its own peculiar symptomatology. But it is only in rare and typical cases that such a division can be at all helpful in setting forth a picture of the disease.

To the experienced and watchful physician there are certain prodromal symptoms that in many cases are sufficiently pronounced to attract early attention to the approach of serious disorder, and it is in such cases, and in such cases only, that our remedies will be found of value. These early symptoms are gradual—sometimes rapid—emaciation, restlessness, impaired digestion. At night the child grinds his teeth, has night terrors, wakens frightened, or has strange fancies and delusions. In some cases there is a newly-developed perverseness, so that a naturally tractable child becomes unmanageable and willful, or is irritable and peevish; in other cases, the child becomes taciturn, sad and apathetic, indisposed to play; the appetite is fickle, with craving for strange and unsuitable things. One of the most characteristic symptoms of this early stage is when the child will waken with a scream, or will sit up in bed and shriek. Even now there may be headache, though this usually forms a prominent symptom later on in the progress of the disease. There may be some squinting or twitching of the facial muscles. Many or all of these symptoms are often so slight that they pass unnoticed till too late; but all of them are significant and not one of them should be allowed to go unheeded.

There is often a remission of symptoms during this early stage, so that physicians and friends think that the child has recovered his health; but this is generally delusive, and a little later the same symptoms return with increased violence. Head-

ache will now be complained of, or indicated by sign language; a convulsion is likely to occur, or the child lies in a comatose state, with pupils unequally dilated, pulse rapid and irregular, respirations sighing, or of the cheyne-stokes variety. The child complains of light and sound; the tongue is dry, or has a thick, moist coating, with red edges. During sleep he occasionally utters a sharp, shrill cry without awakening—the *cri encephalique*—so characteristic of the disease.

When these symptoms are present, we have a typical case of tubercular meningitis in the first stage. But they are inclined to remit and remit again, until sometimes weeks and even months go by before the critical stage is reached. More often the case goes on gradually from bad to worse, unless the nature of the disease is early recognized and remedies are brought to bear upon it. The apathy increases; the eyes are less sensitive to light; the constipation is obstinate.

After a variable period the child shows signs of disturbances of nerve centers, due to increased exudation and pressure at the base of the brain. This is manifested by strabismus, twitching of facial muscles, paralysis or coma. If the anterior fontanel is still open, it is found bulging, and the scalp covering it is tense from pressure of the effusion beneath. The fever in tubercular meningitis is not usually high. It may not exceed 100° Fahr. until towards the fatal end. The pulse is often below the normal in frequency, and in nearly all cases is extremely irregular. In the latter stages of the disease, frequent and long-continued convulsive seizures are apt to occur, and death may take place during or immediately after one of these attacks.

The patient may take the food which is offered up to the last, though at other times, or in other cases, there seems to be an actual inability to swallow it, even when it is placed in the mouth, owing to the paralysis of the muscles of the tongue and pharynx.

Inclination to remit in all stages is a characteristic of the disease. Unequal dilation of pupils may be said to be considered a reliable symptom of beginning trouble, and should attract our attention and call for prompt action. The irritation and change in temperature, with restlessness, crying out in sleep and sudden vomiting without nausea, are constant symptoms of the premonitory stage and should cause alarm.

The irregular pulse and respiration are sure indications of progress. The temperature is of very little help in diagnosis. The coated tongue and offensive breath are not infallible, but help to make up the case.

Diagnosis.—Usually the disease offers but little difficulty in diagnosis, especially after it is well developed; although none

of the above symptoms singly are pathognomonic of the disease, still taken as a whole, considering age, antecedents and previous health, you have a case not easy to mistake. The real trouble is in the very early stages before all symptoms are developed. Then it is sometimes difficult to say that it is the beginning of brain disease, and yet this is the critical time in the disease. A failure to recognize the importance and meaning of these symptoms will turn the case from possible recovery and gratitude of friends to sorrow and death.

The diseases for which tubercular meningitis is most likely to be mistaken are acute simple meningitis, early stage of typhoid fever, acute gastro-intestinal disturbances, worms in intestines, teething, the hydrocephaloid disease of anemia and cerebro-spinal meningitis.

Acute meningitis is distinguished by its sudden invasion without prodromatous stage, family history, previous health, intensity of symptoms and duration, which is much shorter.

The early period of typhoid resembles meningitis, but the coated tongue, diarrhea, enlarged spleen, tympanites, abdominal tenderness and gurgling, the eruption and the characteristic temperature curve, will decide the diagnosis.

Intestinal irritation from worms very closely resembles tubercular meningitis, and is at first very hard to differentiate, but a close observation of the case, family history and course of the attack, high temperature, etc., after careful analysis ought not to mislead very long in the case.

The hydrocephaloid condition spoken of is due to exhaustion and nervousness, caused by improper nourishment, or impaired digestion, and thus readily excluded.

Cerebro-spinal meningitis, usually epidemic, is distinguished by sudden and acute attack, intensity of symptoms, the eruption, and prominence of spinal symptoms. There are rare cases of cerebral irritation, which closely simulate tubercular meningitis. When it is impossible to say just what the matter is, sometimes called cerebral congestion or brain fever. Such a case runs a longer course with varying symptoms, all pointing unmistakably to brain affection, and finally gets well. There is nothing to do in such a case but to withhold a positive opinion, treat existing conditions as we find them, and wait.

Prognosis.—After the case has passed the prodromal stage and progressed to the second with deposit of tubercles, the prognosis is very grave, and even should we succeed in staying the disease of the brain, it is only to see tuberculosis of the lungs develop, or a recurrence of the brain symptoms.

Pepper, in his work on "Diseases of Children," says: "That

in almost all cases of reported recovery, the diagnosis was erroneous."

Treatment. — Jahr, in his "Forty Years' Practice," thus speaks of his treatment of meningitis: "This disease, which is so apt to run into acute hydrocephalus, is curable by homeopathic means under almost any circumstances, as long as it still retains the form of meningitis and the physician recognizes its true character at the outset. Under a proper treatment, all danger to life sometimes disappears in forty-eight hours. Only no time must be lost with *aconite*, which has never been of the least service to me, but *bell.* 30th, has at once to be given, a teaspoonful of a solution of three globules in water every three hours. In most cases a decided improvement will be noticed, even after the lapse of only twenty-four hours, and not unfrequently this remedy alone will be found sufficient to completely restore the patient's health. If the physician is called too late and effusion has already begun to set in, *bell.* will sometimes fail us; in such a case I approve, with the fullest conviction, of Wahle's recommendation of *bryon.* 30th, one globule dry on the tongue, and still more of *sulph.* 30th, administered in the same manner, which has altogether rendered me most efficient service in the meningitis of children. It should be remembered that sulph. does better after several other remedies have been given first, than when the treatment is begun with this agent. If the disease has entered upon its third stage, that of fully-developed effusion, not much can be expected either of bell. or bryon., but, unless it should be too late to do anything for the patient, a great deal may yet be accomplished by means of *helleb.*, which has likewise been recommended by Wahle; and still more certainly by sulph., and perhaps by *apis*, which, in one case at least, where I had given up all hope of saving the little patient, and only gave this remedy as a last resort, had such a marked effect that a single dose of sulph. proved afterwards sufficient to restore this very sick child to perfect health."

Jahr also says this of *cuprum:* "One of the most admirable brain remedies, if indicated by spasms in the fingers or toes, oppression on the chest, lockjaw. If the cerebral disease develops itself after suppression of erysipelas or some other eruption, or even after suppressed catarrh, or during the process of dentition, I prefer cuprum to bell."

The consummate faith in the higher potencies held by the early leaders of our school, excites our unbounded admiration. There is no question but their faith was well founded. What is the trouble now? Is it because the course of disease has changed, or that infantile constitutions have become less

responsive to our attenuated remedies, or have we lost, to some extent, the art of accurate prescribing? Certain it is we do not, in these degenerate days, get the same results claimed by the early prescribers.

However it be, tubercular meningitis is, at the present day, one of the most obstinate and intractable diseases which we have to encounter. Cases, however, do recover, and if early enough recognized, there is ground for hope that our efforts and remedies may prove effectual. In addition to the remedies above mentioned, there are others which have seemed to abate the incipient disease, or postpone the inevitable result. Among these are *gelsemium* and *veratrum viride*, but their indications are too well known to require repetition here. During the comatose stage, *opium* will be found most serviceable. It has no influence over the effusion or thickening, but it relieves the venous stasis and arouses the torpid circulation of the brain.

Zinc is one of the great brain remedies, and is especially useful when cerebral paralysis seems impending. Dr. Hale prefers the phosphid. My own experience has been more with *zincum met.* and *valerianate*. *Camphora*, especially the mono-bromid of camphor, is a remedy of great value in the stage or irritation before the disease has become fully established.

Dr. J. Compton Burnett, in his work on "Tuberculosis," reports many cases of genuine tubercular meningitis cured with *tuberculinum*, in the 30th and higher potencies.

Dr. T. F. Allen emphasizes the power of *kali carb.* The kali carb. patient may be fat, flabby and exhausted, "but is always anemic. He is chilly, never has fever, and is worse from exposure—especially to damp air." This is undoubtedly a powerful constitutional remedy in the early stage of tubercular meningitis, and should not be forgotten.

Children with meningitis must be kept very quiet and free from all excitement. Plenty of fresh air, wholesome, unstimulating food, regularity of daily life are essential hygienic adjuvants.

CHAPTER XIII.

HYDROCEPHALUS.

THE amount of fluid in the brain varies under different physiological conditions. This is especially true as to age and sex. The proportion of water is gradually diminished from birth to the age of twenty, after which it gradually increases. It is greater in the male than in the female. In adults, the proportion of water is greater in the gray matter than in the white, while in infants the reverse is the case. Acute disease very generally causes an increase in the quantity of water in the brain tissue and its cavities. This increase is most marked in meningitis and hydrocephalus.

Hydrocephalus is a condition in which there is a gradual accumulation of serous fluid within the cranium; in most cases in the cavities of the ventricles; quite rarely in the arachnoidal space. The effusion produces pressure, expanding the cranial contents and the soft, yielding bones, causing the head to enlarge. Those cases developing the disease after the bony structures have become more firm, will exhibit less of this almost characteristic deformity.

It is a disease almost exclusively of infancy and early childhood, and often congenital. Even those cases in which the excess of fluid is not appreciable at birth, but makes its appearance very soon after, are congenital, since the vice operating to produce it, probably exists before birth.

I shall consider the disease only in its chronic form, congenital and acquired, leaving the various dropsies of the brain resulting from meningitis and other acute diseases to be described in connection with those affections.

If the disease is plainly present at the time of birth, it may present a serious impediment to delivery, even necessitating perforation of the membranes. Under the influence of violent uterine contractions, the membranes and scalp have been known to give way, and the contents discharged, followed by speedy termination of labor.

The anatomical changes and the clinical course of the disease, in either congenital or acquired hydrocephalus, are not sufficiently different to necessitate a separate description. It is, however, a fairly well-established fact that the cases of congenital

hydrocephalus generally present a more extreme development of the symptoms than when the disease is acquired.

Primary The etiology of hydrocephalus is still somewhat uncertain. It is often hereditary. Dissipation of all kinds, lead poisoning, syphilis, tuberculosis, and struma in the parents are supposed to predispose to the disease. Certain it is that a woman who has once given birth to a hydrocephalic child, is very liable to have the succeeding children hydrocephalic.

A large proportion of the cases of congenital hydrocephalus are no doubt due to a low type of inflammation of the lining membranes of the ventricles, beginning during fetal life, and continuing after birth. There may or may not be *post-mortem* evidences of such inflammation.

Secondary In the acquired cases a frequent cause is obstruction to the venous circulation in the brain. This may be caused by pressure on the return vessels or sinuses, either by tumors, tubercular deposits, or cysts, within or without the brain, causing congestion of the ventricular membranes. Enlarged glands of the neck may produce the same result by causing pressure on the veins emerging from within the skull. No doubt the most frequent cause of this disease is some constitutional taint, resulting from an anemic, scrofulous, or rachitic condition, or by acute disease in which the blood has become impoverished.

Morbid Anatomy.—The alterations in the bony parts of the head are marked. Those bones which enter into the formation of the dome or arch are most markedly affected. The vertical portion of the frontal, the parietal, the squamous portions of the temporal, and the upper part of the occipital bone are all thinned and often elastic and enlarged much beyond their natural area. The size of the sutures and the fontanel are increased and fluctuation can readily be detected in them. If the amount of fluid is large, the frontal bone is tipped forward and the direction of the orbits are changed, and the eyes present a peculiar appearance, having the lower portion of the cornea hidden under the lower lid, while a distinct line of the white sclerotic is visible between the upper margin and the upper lid.

The contour of the head is rarely regular, the sides usually bulging, causing the top to appear rather flat. This gives the face a peculiar triangular appearance, the triangle being inverted, the top of the head forming the base and the chin the apex. The bones at the base of the skull are little affected, though cases have been reported where even here there had been decided displacement. In rare cases, where the amount of the effusion is not so great, the size of the head is not so apparent, and the displacements not so marked; but usually a well-marked case will present the appearance described.

In acquired hydrocephalus, making its appearance after the bones of the skull are more or less firmly united, the bony deformity of the head may be scarcely perceptible.

The quantity of the effusion may be anything from normal to eight, ten, and even twenty pints. The usual amount, however, is not so great, and generally there is present not more than a pint or two. In the acquired cases there may be only a few ounces. The fluid is clear, or slightly turbid, and of higher specific gravity than normal cerebro-spinal fluid. It is alkaline in reaction and contains more or less albumin, the percentage of albumin, according to Huguenin, being in direct ratio to the activity of the inflammation.

The effect of this effusion in the cavities of the brain is to expand them in all directions. The cerebral substance, by being compressed between the fluid and the skull, is greatly thinned and distended, at times constituting a mere shell. The ventricles are in free communication, and the septum lucidum is torn or entirely obliterated. The foramen of Monro, and the aqueduct between the third and fourth ventricles are distended. The structures on the floor suffer equal distortion. The corpora striata are separated and very much flattened. The crura, the corpora quadrigemina, the optic thalami, the optic tracts, the cerebellum and the pons are all flattened. The convolutions on the surface of the brain are completely obliterated.

The membranes lining the ventricles often present thickened surfaces, and opaque patches, but these evidences of inflammation are not always present, even in cases supposed to be of inflammatory origin. In the acquired form, where the structures are more firm and the fluid less, the linings of the ventricles show more marked inflammatory changes, the structures on the floor being dotted over with small nodules.

If the fluid is in the arachnoidal space, "external hydrocephalus," it is spread more or less evenly over the surface of the brain. The brain substance is likely to be softened, or even reduced to a pulpy consistence on the surface. The fluid in such cases will be more dense, and the evidence of inflammatory action more apparent. Such cases should be properly considered as meningitis with effusion, and not as hydrocephalus.

Symptoms.—The prominent symptom is the large head. This is especially true in congenital, or early-acquired cases. The head grows steadily, but there is a marked lack of corresponding bodily growth. The head and abdomen are large, but the arms, legs, and chest are thin and small. As the head increases in size the child is unable to hold it up, and may support it with the hands, and later can only rest it on a pillow.

If the progress of the disease is slower, and the child reaches the age when other children learn to walk, it will not make an effort, and if placed on its feet will not "brace" itself, but will sink helplessly down. If it learns to walk, it will be a slow process, and the gait will be unsteady and uncertain.

The mental development depends upon the effusion. The greater the quantity, the less the development. Early in the case, the child may seem simply a little backward. There may be no development, or very little, or there may be actual loss of mentality; in fact, there may be any condition, from simple feeble-mindedness to actual idiocy. In other cases, the mental faculties are not much disturbed early, and for a time seem to develop normally. It is even possible for marked enlargement of the head to take place, without any indication of pressure on the brain centers. Dr. Bastian reported a case in which the head measured twenty-four inches in circumference at the age of two and a half years, with no brain symptoms or other disturbances. This child's head had been steadily enlarging for eighteen months. Such cases are extremely rare, for nervous symptoms are seldom absent, even early in the case, and in many instances they are the first evidences of trouble, often presenting themselves long before the enlargement of the head is noticed.

In these cases, the first symptom of central irritation is likely to be a convulsion. These attacks may, at first, be infrequent, becoming more and more frequent as the case progresses. There may be slight twitchings of the face, rolling of the eyes, or pronounced general convulsions. The enlargement of the head is, in rare cases, preceded by symptoms of trouble at the base of the brain. Dr. Bastian reports the case of a child four years old, who fell, striking the back of the head with great force. Soon after it presented symptoms of cerebellar irritation. In a year or more the head began to enlarge, and hydrocephalus constituted the prominent condition.

Pain in the head is always a prominent symptom, even young infants showing that they suffer, by frequently crying and moaning, and placing the hands on various parts of the head. The constant rolling of the head on the pillow, often so markedly present, is no doubt due to this cause.

The symptoms in acquired hydrocephalus and those in congenital cases are much the same, except in cases that begin after the bones of the skull have become more or less firmly united. The symptoms then are obscure, for the signs of distention are not visible. The child becomes dull and languid; there is headache, dizziness, disinclination to play, and it is easily fatigued. It sits about and rests its head upon the hands,

or in other ways supports it. The gait becomes unsteady and irregular, and twitchings and a tendency to convulsions are frequent. The pupils react slowly, and finally become dilated, and epileptiform seizures, followed by vomiting and severe headache, are more or less frequent. There may be numbness of the hands and feet, paralysis of certain extremities, hemiplegia or complete inability to walk or even stand. Nystagmus and strabismus are often present, and not infrequently loss of vision. The senses of hearing and smell may also be impaired, but not so frequently or markedly as that of vision.

The appetite in most cases is good or even voracious. Digestion may be unimpaired, even in gluttony, and yet, while in some instances the child may be fairly well nourished, the great majority early show signs of failing nutrition. This becomes more marked as the disease progresses. The body grows thin, the muscles atrophy, the skin becomes dry, the abdomen grows tympanitic, and little resistance can be offered to other diseases that may supervene.

Prognosis.—Most strictly congenital cases of hydrocephalus die in a comparatively short time after birth, and many during the parturition or very soon after. The great majority do not live longer than from six months to two years. Very rarely a case may survive as long as three years.

The duration of the disease is, however, extremely variable. While the course in congenital cases is usually very rapid and death may result in a few months, some of the children in which the disease is acquired later in infancy or in early childhood, may live to reach the age of five, six, or eight years. The duration of those cases in which the disease begins after the bones of the skull have become united quite firmly, and which present the nervous phenomena described above early in the case, will depend upon the activity of the disease and the rapidity with which the serum is effused.

Most cases that run a long course are marked by more or less distinct periods of remission, when the head ceases to enlarge and general nutrition improves. These periods vary in duration, sometimes continuing long enough to encourage the the belief that the disease has been arrested. Disappointment, however, is almost sure to follow. Even if the disease is arrested and the sutures ossify and the fontanels are filled in, there remains the abnormally large head and a more or less impaired intelligence.

Dr. L. W. Sedgwick reported a most interesting case in which the termination of a decidedly hydrocephalic condition occurred by spontaneous evacuation through the nose. The little patient was two years old. Two of his brothers had died of hy-

drocephalus. He had had a large head since birth. He complained frequently of headache, became listless, and often wanted to lie down. His sleep was restless, and he often awoke with a scream. The head began to enlarge, and soon the fontanels as well. The symptoms of brain pressure, such as dilated pupils, disturbed respiration, insensibility to surroundings, etc., made their appearance and progressed to such a degree as to make the case appear every day more hopeless. At this stage a copious watery discharge from the nose made its appearance, and gradually all the threatening symptoms disappeared. After the lapse of a year, they again made their appearance, and were again, and this time permanently, relieved in the same manner.

Another similar case of spontaneous evacuation was reported by Barron. This child died, and the autopsy disclosed a small opening through the ethmoid bone from the cranium to the nose.

When death results directly from hydrocephalus, it is caused by the gradually increasing pressure of the accumulating fluid. The child becomes comatose, and remains in this condition to the end. Death is due to complete arrest of brain function.

Hydrocephalic children are extremely liable to acute diseases. Bronchitis, pneumonia, intestinal disorders, or some of the eruptive diseases frequently terminate the lives of these little sufferers.

It is not uncommon to find, associated with congenital hydrocephalus, other malformations, such as spina bifida, cleft palate, and hare lip. Spina bifida is probably the most frequent, due, no doubt, to the increased pressure of the excessive fluid, preventing normal closure of the canal. Webbed fingers and toes, and impervious nostrils have also been noted.

Treatment.—In a disease which results so generally unfavorably, very little satisfaction is derived from the use of drugs. Of all the medicines, which the old school has used to check or reduce the amount of the fluid, the *iodid of potash* alone has kept a place with them. This is still given in moderately large doses, and in some cases has appeared to be beneficial.

Eustace Smith still holds that the *chlorid of mercury*, persistently given, will, and often has, succeeded in arresting the disease. This opinion is not shared by other equally close observers. Homeopathically such remedies as *apis mel.*, *arsenic alb.*, *calc. carb.*, *calc. phos.*, *cina*, *ferrum phos.*, *helleb.*, *sulphur* and *zinc* might be expected to be of benefit in this condition; but experience has done little to confirm this expectation so far as the ultimate termination of the disease is concerned.

Compression by elastic bandages or adhesive straps has been

quite generally employed with doubtful benefit. If the elastic is employed, it should be applied "just tight enough not to have the material impress its pattern on the skin." In using the adhesive strips great care is necessary not to apply them too tight, and they must be removed and reapplied at intervals. Should symptoms of pressure make their appearance, the bandages or strips must be removed at once, and may be reapplied. Dr. Dickinson and Dr. J. Lewis Smith have each expressed the belief that the rapidity of the effusion may in this way be modified. Puncture and partial evacuation of the fluid has been frequently performed, but the effect has been merely to give temporary relief, since the reaccumulation of fluid is sure to follow, and usually more rapidly after each puncture. There is, besides, some danger of setting up active traumatic meningitis, though J. Lewis Smith characterizes the operation as "simple, devoid of danger, and easily performed." He makes the puncture at the outer angle of the anterior fontanel, and removes only a small quantity each time, and keeps constant pressure applied by means of adhesive straps.

The careful attention to the general health of the child is of the highest importance in this disease. It should be very carefully fed. The general nutrition must be kept as good as possible. Since the disease is so frequently associated with a rachitic condition, the remedies suggested by this diathesis will often be indicated. Any disturbance of the digestive organs must be promptly corrected and the general hygiene carefully regulated.

PART XII.

DISEASES OF THE SKIN.

CHAPTER I.

ECZEMA (CRUSTA LACTEA—MOIST TETTER—SALT-RHEUM).

Definition.—Eczema is an acute or chronic non-contagious inflammation of the skin, characterized by an eruption which may be erythematous, papular, vesicular or pustular, or else a combination of these forms, attended by more or less infiltration and itching, terminating either in discharge with the formation of crusts, or in desquamation.

It is most protean in its manifestations, may involve a circumscribed area, or more rarely cover extensive surfaces, and is often extremely persistent.

It may begin with a slight erythema of the skin, accompanied by a sensation of itching and burning, which, as the disease advances, becomes almost intolerable; soon an exudation is noticed, that rapidly dries into fine scales; and, after these scales desquamate, the skin is left in a thickened and dry condition.

Or it may present vesiculation or pustulation as the first noticeable symptom, followed by a sense of heat and swelling. The vesicles or pustules, as the case may be, according to the number of leucocytes which the contained fluid holds, soon rupture, and thick yellowish or greenish crusts are formed, situated on an inflamed and exuding surface. These crusts continue to form for some time, when suddenly the character of the eruption may change, the exudation ceases, and no more crusts form, and instead of the inflamed and exuding surface, the skin will become dry and desquamate in fine dry scales, leaving the integument in a fissured and infiltrated condition.

Or it may make its appearance in the form of papules, which may either preserve their special characteristics throughout their course, or pass into other lesions.

Eczema is no respecter of age, sex, race or conditions of life. Infants of a tender age are subject to it, and it is often one of the first diseases to attack the new-born. It has no particular

section of the country to which it confines its ravages, and is met with in country as well as in city practice.

It does not confine its invasions to the poor, who are quartered in hovels and surrounded by filth and squalor, but often finds its way into the palaces of the rich, and many are the patients, reared in the lap of luxury, that come under the physician's care for relief from its terrible irritation.

No particular portion of the body can be called its favorite seat, for it is met with on the scalp, face, neck, body, extremities, folds of the skin, the hands and the feet.

Eczema, while met with at all ages, is preëminently a disease of childhood.

In a practice covering a period of nearly thirty years in this city, it has been our experience that about forty per cent. of all skin diseases are eczematous; and further, that about forty per cent. of all cases of eczema occur in children under ten years of age.

A careful study of cases occurring in individuals of varying age will reveal the fact that the disease tends to descend from the upper portion of the body to the lower, as the person grows older; for the head, and most particularly the scalp, is affected in infancy and youth; in adult life, the genitals, from their functional activity, and the trunk are mainly involved; and as old age gradually and silently overtakes the patient, the disease creeps down to the lower extremities and to the feet.

Etiology.—The causes of eczema are external and internal. The common external causes are irritations of a mechanical, chemical or thermic nature. The principal internal causes are irritation of the alimentary canal, deficient functional activity of the kidneys, hepatic derangement, and vital depression. In most cases it is probable that the chief factor is reflex irritation of the nervous centers, producing a dilatation of the capillaries in the different regions of the skin affected. Transmitted tendencies are believed by some to play a not unimportant part in its causation. Dentition, also, is a prominent cause, and while the process is a physiological one, and in its normal procedure should cause no systemic disturbances yet when the teeth are delayed, or when from a tough gum they cause pressure on the dental nerve terminals, then by reflex irritation they have the power of setting up an inflammation of the skin which, in those having a weak and delicate integument, will frequently become eczematous; and anything which tends to lower the vitality of the system, combined with impaired nutrition and disturbed circulation, may give rise to an attack of this disease. It is not uncommon to find a reflex neurotic eczema associated with an adherent prepuce.

The idea that vaccination causes eczema was widely accepted by both physicians and laity at the beginning of this century, and doubtless, had some apparent facts to support it. This idea is easily explained by the theory of latent disease, and it is possible that when the disease follows upon vaccination a close examination of the child would probably reveal plenty of evidence pointing to an eczematous tendency, either from the child's history, or symptoms prior to the operation, or from the history of the parents, and the vaccination had simply aroused this latent disease into activity, but had not caused it. However, the best plan to pursue, when about to vaccinate, is conservatism; and unless the vaccination is imperative, to wait until the eczema is cured, or its presence disproved.

A common external cause of eczema in the new-born is the injudicious treatment it receives during the twenty-four hours following its birth. The sudden exposure of the skin to a change of nearly thirty degrees of temperature; the anointing of the surface with inferior, and often rancid oil; the carelessly administered initial bath with its chilling water, coarse cloth or rough sponge, irritating alkali soap, and rough towel; the coarse, cumbersome and illy-adjusted napkin and pinning blanket; the large and often misapplied binder, all tend to fret the baby, and not infrequently so irritate the integument as to induce a congestion or a follicular inflammation which may be a starting point for a widespread eczema.

Often the vernix caseosa at the first washing is imperfectly removed from the scalp, and this being allowed to dry and decompose, induces an inflammation which becomes an eczema unless checked. Besides this, other causes are at work. Not infrequently, through the carelessness of the mother or nurse, the napkins are not changed as often as necessary, and the feces are thereby left to ooze into the folds of the skin around the thighs and anal region, where they dry, and their sharp edges cut and irritate the tender skin; or the urine flows over the genitals, scalding and burning them; and the milk is vomited, saturates the clothing around the neck, and unchanged, is left for hours. All these causes cannot fail to produce that condition of skin known as intertrigo, which is but a step removed from eczema.

Then again, it is not improbable that certain micro-organisms which float in the air, or are contained in the water used in the bath, play a very important part in the development and continuance of eczema in individuals having a tendency to it.

Another etiological factor that demands attention is the abuse of the nursery *materia medica*, which is responsible for a large number of cases. Such common and well-known reme-

dies as castor-oil, goose-oil, sage-tea, catnip-tea, whisky, paregoric, soothing syrups, etc., are all given indiscriminately, and produce this disease by interfering with digestion and assimilation, or by irritation of the nervous system and lessening of the general tone.

Varieties.—The varieties of eczema dependent on the primary or characteristic lesion are — erythematous, vesicular, pustular, papular, exfoliative and fissured. These forms may, in their progress, become complicated with or be followed by certain secondary lesions.

The varieties of eczema dependent on the activity or on the duration of the process, are the acute, and sub-acute, and the chronic.

The clinical features of eczematous lesions are often modified by locality ; especially is this noticeable on the scalp, face, hands, feet and genitals.

The erythematous variety is characterized by small or large, bright or dark-red, slightly desquamative patches, accompanied by itching or burning. It is most commonly located on the face and genitals.

The vesicular variety is characterized by the appearance of a diffuse or punctate erythema, on which minute, closely-aggregated vesicles appear, accompanied by burning and itching. The vesicles soon rupture, either spontaneously or from scratching, and leave a raw, reddened surface, which becomes covered with a yellowish, gummy crust. It is attended with more or less infiltration and swelling, and the exudation stains and stiffens linen. Its most common seat in children is on the face and scalp.

The pustular variety may originate from the vesicular form, or arise directly, and consists in an aggregation of small pustules—larger than the vesicles—which rupture and form dark, greenish crusts. It is most common in strumous children, and its favorite seats are the scalp and face.

The papular variety consists of small, red, aggregated papules, accompanied by severe itching. It is frequently associated with the vesicular form. It is apt to occur on the arms, forearms, thighs and legs, especially the flexor surfaces.

The exfoliative variety is a variety only from a clinical standpoint, and is characterized by a continuous exfoliation of the epidermis, generally from a reddened surface, accompanied by considerable itching. It is most commonly observed on the neck and extremities.

The fissured variety also is a clinical variety, and presents cracks or fissures of varying size and depth, which are often very painful. The palms and soles are its favorite seats.

Unna describes three forms of infantile eczema, attacking especially the head and face—the tubercular, the nervous, and the seborrheic. The tubercular form is observed mostly on the face, or in strumous children, in association with conjunctivitis, rhinitis and otorrhea. The nervous form is due to reflex irritation from derangements of the alimentary canal or from teething, and appears chiefly on the cheeks, forehead, lower part of the arm, posterior surface of the forearm, and radial surface of the back of the hands and wrists. The seborrheic form is apt to be preceded by a seborrhea of the scalp, that makes its appearance shortly after birth. The lesion becomes moist, but still retains its fatty character, and invades the ears, forehead, eyebrows and cheeks. It is less irritable than the nervous form, and displays a disposition to generalize on the genitals, back and lower extremities.

The majority of these several varieties of eczema pass through different stages, which, for practical convenience, may be called the first, second and third stages.

Symptomatology.—In acute cases, the first stage is the period characterized mainly by hyperemia, with redness and vesiculation. This period is often, but not always, ushered in with a general malaise, loss of appetite and more or less disturbance of the circulation; and these symptoms are followed soon by an eruption covering a variable area and accompanied by heat and burning. In a few hours, or, at the most, a day or two, after the appearance of the eruption, fine, pearly points are seen on the inflamed surface, and with more or less itching the vesicles erupt. The vesicles are closely grouped and are very small. They seldom last more than twenty-four hours, rarely over forty-eight; are made up mostly of serum which contains some fibrin and a few leucocytes. The most prominent subjective symptom now, is the itching, and the disease is entering the second stage.

The characteristics of the second stage are exudation and crusting; and this stage may last an indefinite period. As the disease spreads, the advancing border may be marked by new papules and vesicles forming; or by the stratum corneum becoming exfoliated. This pathological phenomenon is one of the natural consequences of the exudation following the primary congestion, which instead of raising the layers and forming vesicles, may ooze through and float the corneal layer off of the cells. As the disease advances and the vesicles mature, the character of the contained serum changes; from being clear it clouds, and finally pus forms, and the vesicles become pustules, which are ruptured either by friction or spontaneously. Characteristic yellowish-green scabs are formed upon the surface

from the contents of the pustules, which dry into these scabs, soon after they are ruptured. These scabs can be removed by brisk rubbings with soap and water, leaving the skin in a reddened and inflamed condition; and on this reddened and inflamed surface numerous fine beads of exudation soon make their appearance.

The third stage is the stage of decline; and is characterized by a gradual lessening and cessation of all the symptoms; the exudation decreases, the effusion becomes less, the crusts grow thinner, the surface dries, and instead of the unsightly scabs which have hitherto formed, thin, white scales are seen, which, if the patch tends to recover, become finer and adhere more firmly, and the skin gradually returns to its normal condition without a scar.

This is the typical course of the disease, but it is not an infrequent occurrence for the attack to stop short at any of the stages of development, or advance from the first to the third stage, skipping the second. Often the eruption may, from first to last, be simply erythematous (*e. erythematosum*). Again, from a condition of hyperemia, the disease may suddenly develop small, red papules and then linger (*e. papulosum*), or vesicles may be quickly formed from these papules (*e. vesiculosum*); while in another case the inflammation passes directly to the pustular form (*e. pustulosum*). Lastly, the disease may run its typical course, or pass over any of the first two stages, and remain stationary for an indefinite length of time in the third stage (*e. squamosum*).

The course of the chronic case is somewhat varied, for it may start as a primary affection, or with acute or sub-acute symptoms, and halt in the second or third stage, particularly the third stage. In these cases the invaded surfaces are generally limited, but in unusually severe attacks the eruption may involve the entire skin. These are exceptions and are very rare. The chronic variety is more common than the acute; and when an eczema takes on a tendency to repetition, or shows definite lines in its action, and secondary changes accompany these, it may be called chronic. These cases generally have considerable pruritus, and occasionally suffer an outbreak, acute in character.

When this disease occurs on the scalp—the most common locality in infants—it passes from the erythematous and vesicular stages very rapidly to the pustular; and the exudation forms thick, hard, greenish crusts that are situated on an inflamed and fissured surface. In the crusts that are formed the hair is thickly matted, being glued together by the thick, purulent discharge; and in appearance is much like what honey or

gum-arabic, when poured on the scalp, would be. If this is neglected it will run on for years, and very often abscesses form from the retained purulent exudation, and glandular enlargements are not rare.

When occurring on the face it is known as crusta lactea. Here it is met with in various stages, but it is mostly symmetrical, and runs a straight course.

The eyelids are prone to be invaded, and when so situated it is exceedingly troublesome. The margins of the lids thicken, inflame and infiltrate ; and when it is in this condition, its resemblance to inflammation of the Meibomian glands is very strong, and is often mistaken for the latter trouble. The hair follicles may become involved, and partial or complete loss of the eyelashes will result. The most common termination, when occurring about the nose, is the formation of scabs.

The lips and mouth are often affected ; and when the mucous openings are invaded, the disease generally runs a chronic course and is very exasperating. The lips become edematous and fissured, besides being slightly inflamed, moist and scaly. When occurring here, it is mostly of the erythematous form.

A common and exceedingly troublesome location is on and about the ears. They are usually considerably enlarged, swollen and inflamed; and these symptoms are accompanied by a constant exudation, which drips down and hardens into firm crusts. The vesicles are generally developed early, and very rapidly run into the pustular stage.

On the genitals it often proves intractable, from the constant moisture of the parts. There is heat and redness, and quite frequently swelling and severe pruritus. Fissures, which are exceedingly painful, form around the margin of the opening, when the anus is involved.

The arms, legs, thighs, flexures of the joints, and the gluteal folds, are the seats of what often prove to be stubborn cases. These parts are generally affected with severer forms than other portions of the body, are accompanied by the most intolerable itching, and usually pass directly from the erythematous to the pustular stage, where they linger.

On the hands or feet it usually presents a typical course, but often becomes fissured. When occurring here it has but little exudation, and consequently but little crusting. The most common causes of eczema of the hands and feet, are irritants acting locally. On the umbilicus, there is considerable edema ; and here it may occur in the pustular or severe (*e. rubrum*) form. In young children and those not old enough to control the tendency to scratch, the affected portions have " scratch marks " scattered over them in more or less profusion.

Pathology.—Eczema is essentially a catarrhal inflammation of the skin, and, when not due to a local irritant, is either a central or peripheral trophoneurosis.

Diagnosis.—In the typical course, eczema can hardly be mistaken for other skin diseases; but in the imperfect or irregularly developed cases the differential diagnosis requires skill and study.

The erythematous stage is often confounded with erythema, but the symptoms brought out by the subsequent course of the disease will decide the diagnosis.

Herpes and scabies have a close resemblance to the vesicular stage of eczema; but the herpetic vesicles are larger and appear mostly on the face and genitals, while the eczematous vesicles are distributed irregularly over the body and are smaller. The characteristic of scabies is the nightly aggravation of itching, which is absent in eczema; and the presence of acari, which rapidly disappear under anti-parasitical treatment, will dispel all doubt as to the disease.

In the crusting stage it may be confounded with impetigo contagiosa and tinea favosa. The eczema crusts are greenish-yellow; the crusts of tinea favosa are sulphur-yellow and cup-shaped; while those of impetigo contagiosa are superficial and have the appearance of being "stuck on."

The squamous form has a strong likeness to pemphigus foliaceous, seborrhea, dermatitis exfoliativa and psoriasis. Seborrhea has larger scales than eczema, and they are oily. Pemphigus foliaceous starts from bullæ, and has thick, parchment-like scales. Large scabs, which are thin and easily detached, characterize dermatitis exfoliativa, and the surface presents a glazed and reddened appearance when they are removed; the scabs of psoriasis are white and are not formed from any exudation.

E. pustulosum, when involving the scalp, is frequently mistaken for the syphilitic eruption; but there is no previous history of syphilis, and the foul, sickening odor, so characteristic of the specific disease, is absent.

Prognosis.—In acute cases the prognosis is always good; but in chronic cases, and especially those in which the mucous openings are involved, it should be most carefully and discreetly guarded, as these cases are so long-lasting and difficult to treat.

Treatment.—As before stated, eczema is rapidly and thoroughly cured by a vigorous and proper treatment, faithfully and persistently carried out. There are many chronic cases that seem to baffle the best skill of the physician, and yet be prolonged for years in spite of treatment intelligently applied; and this seeming non-amenability has given rise, among the

laity, to the idea that chronic eczema is incurable; but in direct controversion of this lay opinion, it can be said, positively, that all cases of eczema, acute or chronic, will yield to the proper treatment. What that proper treatment is, must be determined by the study of the personal idiosyncrasies of the individual subject, for one case will rapidly improve under simple local treatment, another gradually grow worse under the same measures, until they are substituted by constitutional remedies, when it quickly mends; while still another will show no improvement under these measures used singly, but when they are combined, a rapid change for the better is noticeable. While some are so readily amenable to the simplest local treatment, and others yield quickly to the constitutional, the majority of cases are seemingly not affected by either used singly; but when both of these measures are combined, a rapid and permanent cure will generally be the result.

The local treatment may be divided into two classes—soothing and stimulating. As to the application of these classes, intelligence and a knowledge of the results to be obtained from their use, are required; and one physician, with no more at his command than simple olive-oil and ordinary housekeeper's soft-soap, can accomplish more, where these agents are intelligently used, than can another, with a formidable array of drugs used without a knowledge of their application; and the great cardinal principle in the use of these measures is, to soothe acutely inflamed surfaces, and stimulate the chronic, dry, scaly skin. The degree of irritation should always be governed by the requirements of the individual, for no two cases present exactly similar appearances, and no set rule can be laid down for them.

In using soothing applications, the crusts must be removed, so that the preparations to be used, can come in actual contact with the diseased skin itself. In many cases, the crusts are very difficult to remove, and sometimes great skill and patience are required in their thorough removal, without causing the patient too much discomfort. Generally, however, the application of warm, soft water, combined with gentle friction, will be sufficient to thoroughly cleanse them from the skin; but frequently some crusts are too hard to be removed in this manner, and the application of warm olive-oil will soften them sufficiently to be washed off with the water; while others are so difficult as to require the use of sapo viridis (green soap), which effectually removes the hardest crusts, and in addition, the masses of dead, epithelial cells, exudation, and other débris, leaving the inflamed skin in a thoroughly clean condition, ready for the soothing effects of the emollient application, and the healing process. It often occurs, especially on the scalp, that

the crusts are interlaced with hairs, and their removal can be accomplished rapidly and painlessly in the following manner; raise one corner of the crust, and with a pair of sharp, fine-pointed, curved scissors, snip the hairs, gradually raising the crust and cutting the hairs until it is entirely freed; then wash the surface of all remaining extraneous matter.

After the surface has been thoroughly cleansed, and all crusts and scabs softened and removed, the skin should be immediately anointed with some soothing preparation, so as to protect the raw surface from all atmospheric irritation. It matters not what this emollient be, just so long as it fulfills the required conditions. Olive-oil, either cold or warm, is the most common in use, and is also the most simple. Various ointments and oleates have been used, some with highly gratifying success, and others with indifferent results. Some patients cannot bear what is apparently borne with benefit by others, and these emollients should be used according to the various individual requirements. In some cases with slight inflammation, and in which the exudation is the principal symptom, equal parts of starch and oxide of zinc, or buckwheat or rye flour dusted over the affected surfaces frequently, proves very beneficial. To allay the intense itching, cloths wrung out in hot water and applied over the parts, or the application of a mixture of one dram of carbolic acid and an ounce of glycerine to a pint of hot water, has a decided anti-pruritic action. During the first and second stages, peroxide of hydrogen, diluted with one or two parts of water, may be applied with almost magical effect. In cases in which large areas are involved, great care should be used in the application of mercurial and other ointments over too large an absorbing surface, as severe constitutional symptoms may arise, much to the annoyance of both the patient and physician.

When a chronic case presents a dry, scaly, indurated and thickened skin, the stimulating treatment is indicated. Such severe irritants as green soap, soft and various other potash soaps, etc., are best for this purpose, and frictions with these set up a sub-acute inflammation, when the irritants can be discontinued, and emollient applications used. After the use of the irritants the following will prove useful in many instances: Boil one dram of gelatin, two of glycerin, and three of water until the gelatin is thoroughly dissolved, and then add one dram of oxide of zinc. When required for use this should be heated and quickly applied with a stiff brush, as it rapidly hardens into a thin, transparent, flexible scale. An ointment composed of one dram of white oil of birch to the ounce of vaselin, has proved beneficial in stubborn cases.

The constitutional treatment can also be divided into two classes, *viz.*, hygienic and therapeutic; and the hygienic farther into considering separately the diet, habits, clothing and cleanliness, and surroundings.

In the feeding of an infant, regularity of diet is as essential to its well-being as to an adult; and the practice of nurses and mothers putting the child to the breast every time it cries, is to be strongly deprecated; for if the little one cries very much it is undoubtedly sick, and if it be troubled with indigestion, the breast every ten minutes, or fifteen, or even every half-hour only aggravates the existing trouble: and as indigestion is the cause of many cases of infantile eczema, it is plainly evident how great should be the care concerning the regularity of the diet, as irregular feeding is the main cause of indigestion in infants. In many cases the fault lies, not with the irregularity of the feeding, but with the food on which the child is fed, for sometimes the indigestion is merely a nervous demonstration of hunger, due to the deficient quality or insufficient quantity of the food, which sets up a condition of malnutrition. Or it may be that improper food, such as pastry, pickles, insufficiently cooked, starchy matters, tea, coffee, meat, etc., are given to the child, producing indigestion. Frequently anger, fright, joy, or some other intense mental excitation, or even errors of diet in the mother or nurse, by deteriorating the milk, produce a deranged digestion in the infant.

Sometimes the physician is called to see some puny, ill-nourished infant, whose face and scalp are almost one solid mass of eczema. What are the surroundings of such a case? Rags, dirt, and filth; and an existence in a filthy, illy-ventilated room, entirely innocent of sunshine. The poor, hard-worked mother has not sufficient vitality to furnish the necessary quality of the milk for the demands of the child, and her purse is too slender to procure the required artificial food. And the cleanliness of the child is also neglected, for the mother cannot spare the time to devote to the necessary washings and changes of clothing; and thus, in illy-ventilated and poorly-lighted surroundings, the poor little sufferer, reeking in its own excretions, lives on day after day, through a tortured and miserable existence.

From the above it is plainly evident how absolutely necessary to the health of the average infant is regular feeding, proper food, cleanliness, and good hygienic surroundings. If the food is irregularly furnished, fix certain hours for the feeding and see that they are observed. When the child is nursing, and the milk does not furnish sufficient nourishment, the mother's or nurse's diet should be looked after, and their general health im-

proved. If she does not secrete the necessary quantity of milk, some good artificial food should be given the baby in addition to the breast; or if the child be old enough, and the season be fall or winter, it should be weaned, and that artificial food which best answers all needs of its system, given. If bottle-fed and insufficiently nourished, the food should be changed and experimented with until some one is found that will suffice. If the bowels are constipated or in a diarrheic condition, or the kidneys not properly performing their work, they should be promptly looked after, and measures adopted that, in each individual case, will best restore them to their normal status. Where improper food is the cause, all indigestible foods, as pastry, pickles, tea, coffee, and the various nitrogenous substances are to be prohibited; and only such farinaceous foods fed as will meet all the requirements of that particular infant. Often the mother or nurse, after undergoing some strong mental or nervous excitement, consoles herself by putting the baby to the breast; but this should not be done, and instead, the breast-pump should be used, and the breasts thoroughly emptied of their poisoned contents, and the infant not allowed to nurse for two or three, or even four, hours. This is to be strongly insisted upon, for any woman who gives her child the breast after severe anger, fright, excessive joy or grief, or any other intense mental excitement, runs the risk of causing it to have indigestion, or seeing it thrown into convulsions, often followed by speedy death.

Nor should the bathing be neglected; and the napkins are to be changed as soon as soiled, and the parts washed before clean ones are replaced. By this it must not be inferred that we advocate the frequent bathing of the infected areas, but, rather, bathing for reasons of bodily cleanliness. Instead of using harsh, stiff, linen clothing to scratch and irritate the tender skin, soft flannels should be the material employed in the make-up of the wardrobe. The various infant powders are to be banished, as they absorb the moisture of the skin, sour and cake, and the rough edges cut the delicate cuticle; and instead of these preparations, a thin slip of absorbent cotton should be placed between the folds of the flesh and frequently renewed; and this of itself will in some cases cure an intractable eczema.

When the physician begins to treat an eczema he should insist upon his instructions being carried out to the letter, even to his becoming dogmatic; for it is invariably the rule that the nurse or mother will only half obey his orders, and failure follows, which will be damaging to his reputation.

In considering the indications for the remedies, they will be found to be both numerous and varied. A large percentage of

all the remedies in the *materia medica* have directly or indirectly some decided action or effect on the skin, and, hence, in a work like this, it is impossible to consider all, so we will mention but a few of the leading ones.

Ammonium carb.—Eruption dark red and bleeds easily; intense pruritis relieved by scratching, but followed by sensation of burning; nates, genitals and anus excoriated and painful; especially useful in eczema of flexures of joints.

Arsenicum alb.—Eruption burning and itching, painful after scratching; crusts are surrounded by an inflamed, painful border; pain and pruritis, worse at night and from cold and scratching, but better from warmth; hair falls out; intense thirst; useful in chronic cases that present a dry, white, parchment-like skin, covered with fine branny scales.

Calcarea carb.—Eruption covered with thick, greenish-yellow crusts, formed from the gummy, yellowish, purulent secretion; intense burning pruritis, worse at night and after nursing, better from warmth; painful fissures and cracks of the skin; scalp most commonly involved; useful in light-complexioned, plump children of a strumous diathesis.

Croton tig.—Variable appetite; sensation of water in abdomen; stools diarrheic, thin, watery, green mucus, exceedingly offensive and forcibly shot out of rectum; urine high colored and fetid; face covered with eruption of vesicles, worse in afternoon; intense pruritis aggravated by warmth of bed at night, better in morning and from cold; eruption on the face and genitals.

Graphites.—Skin dry and with a tendency to fissure, the exudation from which excoriates the surrounding parts; the eruption is moist, with thick crusts situated on raw, inflamed surfaces, which exude a thick, corrosive, sticky serum; intense pruritis, aggravated from scratching, and at night; eruption on the palms of the hands and behind the ears.

Lappa major.—Eczema of the scalp extending to the face; moist, bad-smelling eruption on the heads of children; swelling and suppuration of the axillary glands; disposition to boils.

Mercurius.—Skin dirty yellow; eruption involves large areas, which itch intolerably, especially when warm; exudation of a thin serum, which forms dry scales, or an acrid discharge burning and excoriating the skin, and drying into yellow crusts; itching and bleeding after scratching; tendency to lymphadenitis; profuse perspiration.

Mercurius precip. ruber.—Pustular eczema about anus, genitals or umbilicus; pustules on inflamed base and very painful to touch; crusts are formed from the yellowish pustular exudation, they crack and from these fissures the pus is constantly oozing.

Oleander.—Oozing behind the ears, and on the back of the head; smooth, shining surface, covered with drops of serum; extreme sensitiveness of the skin; even the friction of the clothing causes soreness and rawness.

Rhus tox.—Eruption on a raw, excoriated surface, exuding a thin, sticky, offensive serum, which forms thick crusts; mostly on face and scalp; burning and itching, worse at night.

Stannum.—In eczemas due to the presence of intestinal worms; child is very irritable and excessively hungry, while every meal is followed by nausea and vomiting; eczema of lower extremities.

Sulphur.—In the vesicular and pustular varieties, with burning pruritis, worse at night, and leaving a sense of soreness after scratching; exudation, a fetid pus forming thick crusts which bleed easily.

Viola Tricolor.—Humid eruption, with intolerable, nightly itching; discharge of yellow water or pus; swelling of the cervical glands; eczema on the face.

Zinc phos.—Especially useful in eczemas of head and scalp, due to deranged nervous system; trembling and jerking of the muscles; fidgety, restless, and with a crawling or creeping sensation over body; pruritis worse during afternoon and evening.

CHAPTER II.

PSORIASIS (PSORA—DRY OR SCALY TETTER).

Definition. — Psoriasis is a constitutional, non-contagious disease of the skin, characterized by dry, reddish, slightly elevated patches, covered thickly with whitish or grayish, mother-of-pearl like, imbricated scales. It may occur on any part of the body, but is especially liable to appear on the tips of the elbows, fronts of the knees, just below the patella, on the hips and on the head. The elbows and knees are oftener affected in females than in males. When the head is attacked, the eruption extends beyond the margin of the hair, and often forms a ring around the forehead and ears. The back is more commonly involved than the chest. The nails are at times affected, and the free margins may become whitish, thickened and friable. The palms and soles rarely suffer. A sensation of itching is sometimes present in a marked degree, but as a rule it is not troublesome.

Etiology.—Psoriasis seldom appears during infancy, but may occur at any age after three years. Heredity seems occasionally to play a part in its causation. It prevails more in winter than in summer, and in many cases disappears entirely at the latter season, to return with the advent of cold weather. While a few cases may appear to depend upon a gouty or rheumatic diathesis, it is a singular fact that a great majority of psoriatic patients often appear to be the picture of health. In predisposed subjects debilitating influences may precipitate an attack.

Symptomatology.—The lesions invariably begin as small, red papules, scarcely raised above the level of the skin, which quickly become covered with whitish, imbricated scales. The scaly papules usually increase at their periphery, and form flattened patches varying from the size of a pea to two or more inches in diameter. In the progress of the disease the patches tend to run together as they increase in size, and their circular outline becomes lost. Occasionally the centers of the patches clear up and rings or festoons are formed. As the discs increase in size, the skin becomes more infiltrated, and the scales become large, imbricated, and more or less adherent. When scales are removed numerous bright red dots—apices of hyperemic papillæ—are revealed, which are easily made to bleed.

Various designations were given by earlier dermatologists to the different clinical appearances presented by psoriasis in different cases, such as *p. punctata*, when the lesions are pin-head size; *p. guttata*, when the discs are small and round, and have the appearance of drops of mortar scattered on the skin; *p. nummularis*, when the discs have the size of small coins; *p. diffusa*, when the patches become irregular in size and cover a considerable amount of surface; *p. annularis*, when rings have been formed by the patches clearing away in the center, while extending upon their periphery; and *p. gyrata*, when these rings join each other, and form by their coalescence broken semicircles, or graceful festoons. These descriptive names must not be regarded as indicative of so many different varieties of the disease, but simply as expressive of the varying forms the eruption may assume during its progress.

Pathology.—Concerning the pathology, the process is supposed to begin as a hyperplasia of the epithelial cells, and the inflammatory changes in the corium are believed to be secondary to it. The peculiar whiteness of the scales is due to the presence of air between the dry, epithelial cells.

Diagnosis.—The diagnosis of psoriasis in well-marked and typical cases is generally unattended with difficulty. Atypic cases are, however, sometimes encountered where the lesions bear a close resemblance to those of eczema, syphilis, lupus erythematosus and dermatitis exfoliativa. In eczema there is apt to be a history of moisture, while in psoriasis the lesions are invariably dry and scaly. The scales of psoriasis are more abundant, larger and whiter than those of eczema. The patches of the former are bold and well defined, while those of the latter shade off into the healthy skin. Itching is, as a rule, more pronounced in eczema than in psoriasis. A squamous syphilide may be mistaken for psoriasis. In the latter the patches appear to be on the surface, are very scaly, and have a bright-red, inflammatory tint; while in the former, they are dull-red or ham-colored, deeply indurated and only scantily covered with scales. Psoriasis may show repeated outbreaks of the same kind of eruption, while in squamous syphilide previous eruptions will have been of a different type. A scaly eruption confined to the palms and soles is almost without exception a syphilide. Lupus erythematosus is usually found upon the cheeks, the scales are scanty and of a yellow or gray color, and are firmly attached to the openings of the sebaceous glands. In dermatitis exfoliativa the suddenness of the attack, the universality of the cutaneous inflammation, and the abundant and continuous exfoliation of dry, thin, papery scales are sufficiently pathognomonic.

Prognosis.—Psoriasis is one of the most rebellious of the inflammatory diseases of the skin. The prognosis is good as far as any one individual attack is concerned, in ordinary cases. The disease, however, is prone to relapse after a longer or shorter period. Left to itself it may run a variable course, continuing for months, and often for years, or occasionally disappearing spontaneously.

Treatment.—The constitutional treatment of psoriasis is of the greatest importance. The following are the oftenest indicated remedies:

Arsenicum iod.—Persistent itching and burning, and marked infiltration; the skin is dry and scaly, and pricking sensations are experienced; useful in scrofulous subjects.

Arsenicum sulph.—Irregularly rounded, reddish spots, covered thickly with scales, occurring on the trunk, knees, elbows, and hips, attended with itching and burning; adapted to cachectic subjects.

Borax veneta.—Psoriasis on the face and scalp, especially when the skin displays a dingy, unhealthy look.

Chrysarobinum.—In acute cases attended with itching, and when the eruption is profuse on the lower extremities.

Cinnabaris.—In scrofulous and syphilitic subjects, or when the patches are irritable and of a fiery red color.

Manganum.—In inveterate cases and in rheumatic and gouty subjects.

Mercurius sol.—In light-haired people, and in syphilitic and scrofulous individuals; the scalp is frequently painful to the touch, and dry, scaly spots appear all over the body.

Natrum ars.—The skin is dry and rough, and the patches are slightly reddened and covered with thin, whitish scales; patient is sensitive to cold and becomes easily fatigued.

Nitric acid.—Dry, scaly skin, with stinging sensation in the patches, in dark-haired people.

Petroleum.—Psoriasis of the hands and scalp; painful sensitiveness of the skin, itching worse in the open air.

Silicia.—The nails are brittle, thickened and yellow.

Sulphur.—Of service to begin treatment with; in obstinate cases to eradicate a tendency to return.

Local measures are of more or less benefit, according to the nature of the case. The scales may be removed by the free use of soap lotions, alkaline baths, or a two-per-cent. solution of salicylic acid in a mixture of alcohol and castor-oil. Marked success follows the use of a ten-per-cent. solution of chrysarobin in liquor gutta percha, thinly painted on the affected patches by means of a stiff paint brush, and renewed every two or three days. On delicate skins it will sometimes produce an acute

dermatitis, and should always be used with caution. It has the disadvantage of staining the skin temporarily. Owing to the uncertainty of obtaining a good quality of chrysarobin, some dermatologists prefer a five-per-cent. solution of gun powder, of which the former is the active principle. On the edge of the scalp and about the face a five-per-cent. ointment of beta-naphthol or of thymol is preferable to chrysarobin.

A radical change in the dietary is frequently productive of the most beneficial results. As a rule, all stimulating fluids and seasoned articles of diet should be avoided. Some cases are markedly benefited by entire abstinence from nitrogenous foods, while others steadily improve on an exclusive beefsteak and hot-water diet.

CHAPTER III.

MILIARIA RUBRA—(RED GUM, STROPHULUS, TOOTH-RASH).

Definition.—Milaria rubra is the strophulus or red gum of older writers, and is very common among infants, particularly during the period of dentition. It is characterized by an eruption of small red or white papules, varying in size from a pin's head to a small pea. These papules are due to a congestion of the orifices of the sweat ducts, and appear in successive crops, each crop remaining from ten to fourteen days, when it disappears and a new crop takes its place. The papules are in patches of a dozen or more, and are surrounded by an erythematous border.

Etiology.—The principal factor in the causation of miliaria rubra in children, is dentition. This process, when accompanied by abnormal conditions, is highly productive of it, and many cases end spontaneously with the cessation of the dental irritation. When occurring in extreme infancy, it is a result of a congestion of the sweat-glands, due to over-dressing, warm weather, and the rooms in which the child is kept being overheated. Flea-bites are often an exciting cause, when from lack of cleanliness, these little pests are allowed to be generated.

Symptomatology.—The principal seats of the eruption are on the face, neck and arms; although it may be distributed over nearly the entire body. The eruption is made up mostly of papules, which are raised somewhat above the surface, their margins are sharply outlined, are rounded, pale and to the touch have a peculiar hard or "shotty" feeling. In the center of these papules is a semi-transparent spot, giving the papules the appearance of a vesicle, but on being punctured no fluid escapes.

The papules usually appear over considerable extent of surface, generally on the face and arms, and are accompanied by considerable itching; and as they are scratched, as a result of the itching, numerous fine points of blood are exuded, which dry into minute scabs, on their apices. The eruption usually reaches its maximum in three or five days; and then, unless prolonged by some condition, gradually disappears. In infants of a scrofulous diathesis, the papules rapidly undergo suppuration and form pustules.

Diagnosis.—Erythema papulosum is the only disease that can be confounded with miliaria rubra; and the two can be readily differentiated by the severe constitutional disturbances of eczema, and the exceedingly mild, and lack of constitutional symptoms of miliaria rubra.

Prognosis.—Miliaria rubra is a mild disease, and of itself is never fatal. If severe symptoms are present, they are due to some complication.

Treatment.—About the only treatment required is hygienic, as internal medication is seldom, if ever, indicated. The diet is to be carefully attended to, and the bowels regulated. If the gums are swollen and tender, causing much discomfort, they should be freely incised. Strict attention should be paid to the cleanliness of the child and all unnecessary articles of clothing should be forbidden to be put on.

Antimonium crudum, apis mel., borax, calc. carb., chamomilla, etc., may be given as indicated, but in the majority of cases, no remedies are required.

CHAPTER IV.

ERYTHEMA (ROSE RASH.)

Definition.—Erythema is an inflammatory condition of the skin, characterized by an eruption of tubercles, macula or papules, accompanied by a varied degree of pruritis and burning.

It is acute, non-contagious and non-specific in character, and usually runs its course in a few hours, or at most four or five days. Its principal symptom is an hyperemia which appears very suddenly on the surface, and is irregular in outline and of variable extent. The eruption on first appearing is of a bright-red color, which gradually changes to a bluish tint. At first there is usually neither swelling nor hypersensibility; but with the progress of the symptoms the bluish deepens to a dark rose-red, the skin becomes extremely sensitive, indurated and oftentimes fissured, while in neglected cases it may become ulcerated.

While erythema means a redness or hyperemia, the definition of the term is, more strictly speaking, a symptom; and it often occurs in the course of diseases, especially of the exanthemata. Properly treated in its incipency, erythema is usually very simple.

Etiology.—When occurring on the skin of a new-born infant, it is usually a mild cutaneous congestion, due to the change from the influence of the womb during fetal life to the atmospheric irritation immediately after birth, and requires no treatment as long as it remains a simple hyperemia.

The causes of this affection may be divided into two classes, *viz.*: idiopathic and symptomatic. The idiopathic are, extremes of heat and cold; rapid and excessive changes in the weather; hot weather; too frequent bathing; frictions from towels and strong soaps; insufficient bathing; fecal and urinary matters on soiled napkins; pressure from stiff and tight clothing and shoes, instruments, such as trusses, braces, etc.; burns and scalds. The symptomatic cases generally occur as a symptom of some internal disease, as scarlet fever, measles, etc.

Varieties.—Early writers divided this affection into classes, according to the extent of surface involved and the shape

assumed by the eruption ; but this classification is entirely useless, as these manifestations are but the various stages of the disease and not separate or distinct varieties. There are, however, different varieties according to the character of the eruption ; and we shall confine ourselves to the three forms concerned in childhood, and they are : erythema simplex, erythema intertrigo and erythema nodosum.

Symptomatology—Erythema simplex.—The simple form of erythema usually occurs during the course of the acute internal inflammatory diseases ; mostly, however, during the course of those depending on the period of dentition. It often occurs during a high fever from any cause, and especially in those children having an active cutaneous circulation. The first symptom is the appearance of slightly reddened patches, more or less numerous, and of different shape and extent, accompanied by a greater or less degree of pruritis. The color disappears on pressure, but rapidly returns on the removal of the pressure. There is no swelling, infiltration or fissuring of the skin, and as the rash becomes older, its color deepens. After the disease has run its course, the cutaneous symptoms disappear, and the eruption usually ends in desquamation.

Erythema intertrigo.—This form usually attacks the folds of the skin about the nates, hips, anus, arms, neck, flexures of the joints, inner aspect of the thighs, and the genitals. Here it begins as a simple redness, and when neglected, generally runs into a true eczema. In severe cases, there is ulceration, the surface presenting a raw, deep-red, and angry appearance ; from which a serous or sero-purulent exudation, very fetid and acrid, is discharged, accompanied by severe pruritis, burning and pain. When the ulceration has ceased, red or copper-colored spots mark the site of the ulcers, and are very slow in disappearing. If slight, this form will last but a few days, while aggravated cases may be prolonged for months.

Erythema nodosum.—Is the variety that generally occurs singly, but is sometimes accompanied by one of the other forms. It shows a preference for the anterior portion or extensor aspect of the arms and legs, although it may be found on other portions of the body. Its chief characteristic is an eruption of small, painful spots or nodositers, which gradually increase in size. They vary in size from a pinhead to a split pea and never suppurate. After they begin to swell, the skin becomes tender to touch, stretched, and finally so tense as to interfere with the movements of the member, and causes great pain. In a few days the swelling diminishes, the tension lessens, and the pain subsides until it finally ceases altogether. The eruption of the nodules is ushered in with a variable

degree of fever and general malaise. It usually develops rapidly and runs an acute course.

Diagnosis.—Simple erythema is very close in its resemblance to scarlet fever and erysipelas. From scarlet fever it can be differentiated by its accompanying some other disease, its limited area, short course, light color, absence of throat symptoms, and only the superficial cutaneous strata being involved.

From erysipelas, the diagnosis is somewhat harder, and requires more skill. Erysipelas has swelling, smarting and burning; it involves the deeper layers; its margins are well defined and slightly elevated; and it progresses slowly to new areas; while erythema suddenly appears on one spot, and in a few hours, or days, as suddenly disappears; there is no swelling or smarting, some pruritis and burning; it involves only the superficial layers, and its margins gradually merge off into the normal color.

Erythema intertrigo is, in most cases, easily recognized, but may sometimes be mistaken for eczema, as there are so few diagnostic points to differentiate by; and while the intertrigo may become an eczema, the chief point of difference is the infiltration of the skin, which is entirely lacking in the erythema, and when present is indicative of eczema.

Erythema nodosum, when occurring on the anterior aspect of the leg, is at first glance mistaken for a series of bruise marks, but the absence of any history of violence decides against traumatism. It has many features in common with syphilitic gummata, but its more acute course will differentiate. Boils and abscesses are smaller, lighter colored and suppurate; while erythema nodules are larger, darker colored and never suppurate under any circumstances, but disappear by absorption.

Prognosis.—In the majority of cases, the prognosis is good, as the disease tends to a spontaneous termination; but when it occurs in children suffering from intestinal troubles, as enterocolitis, colitis, thrush, etc., the prognosis should be guarded, as these cases are liable to end fatally, especially when involving an intertrigo.

Treatment.—Simple erythema requires no treatment for itself, but the whole attention of the physician should be directed to the disorder which occasioned it. Usually, in the intertrigo, strict cleanliness, regulation of the bowels, separating the overlapping folds and keeping them separated, the application of some powder, as lycopodium, equal parts of starch and oxide of zinc, etc., or zinc ointment, and the internal administration of the indicated remedy will be followed by prompt improvement. In erythema nodosum, the best treatment is *rest* in bed,

hot applications and compresses of hamamelis, a good generous diet, regulation of the bowels and the indicated remedy.

The remedies are indicated as follows:

Aconite.—Fever; thirst; restlessness; skin red, hot, swollen, shining and painful; worse at night.

Arsenicum.—Intense thirst; great pain; burning and itching of the skin, worse after scratching; ulcers dark and angry; exudation very fetid and excoriating.

Belladonna.—Face flushed; head hot; skin exquisitely painful to touch; inflamed red patches, breaking out irregularly over the body, but mostly on face and neck; smooth, scarlet redness of the skin.

Chelidonium.—Prostration; sleepiness; large, red, round patches on arms and face; burning pain and pruritis; spots disappear in a few hours.

Lactic acid.—Debility; aversion to motion, wants to lie still; bright-red spots or patches on different parts of the body, especially anterior portion of thighs and legs.

Nux vomica.—Alternate diarrhea and constipation; general debility, with trembling of the limbs; eruption dark, painful and intensely pruritic.

Rhus ven.—Red spots from half an inch to two inches in diameter, especially on the legs below the knees, painful and changing color into bluish, then greenish-yellow.

Ustilago.—Eruption very fine and of a deep-red color; spots or nodules about the size of a pinhead, very painful and aggravated by scratching; eruption assumes an annular form when it occurs on face or neck.

CHAPTER V.

ZOSTER (HERPES ZOSTER, ZONA, SHINGLES).

Definition.—Zoster is an acute, non-contagious, non-specific inflammation of the skin, characterized by an eruption of vesicles which follow the course of some cutaneous nerve or nerves, and accompanied by an acute neuralgic pain. These vesicles appear in groups, which vary in size and shape, on an inflamed surface, while between the groups, the skin is healthy in color, appearance and function.

It is a self-limited disease, and usually runs its course in from ten to twenty days; and is accompanied by few, if any, severe constitutional symptoms. It has no particular part to which it is confined, but may occur on any portion of the skin. It is met with most frequently involving the intercostal nerves, and when it occurs here it is known, in popular parlance, as shingles.

There is a widespread opinion among the laity that shingles would speedily prove fatal, if, when occurring on both sides, it should meet and form a complete circle around the body; but the fallacy of this is at once apparent, for zoster involves the course of the nerves, and as the nerves do not encircle the body, the two approaching borders can never coalesce.

Zoster occurs with equal frequency in both sexes, and is oftenest observed in individuals under twenty and over forty years of age. It is rare in infants, and is most frequently seen in children between the ages of five and thirteen.

Etiology.—The unvarying rule of the eruption of zoster following the course of a nerve, would suggest some connection with the nerve so followed; and it is in most cases dependent upon some inflammatory condition of that nerve. Thus it will be seen that it is of nervous origin. A careful study of those who are affected with it would reveal the fact that the majority have a thin and delicate skin.

The exciting causes are all those causes, which, acting upon the cutaneous nerves, produce a neuritis of them, and they are: pressure, burns, wounds, cuts, bruises, or traumatism of any kind; and this inflammation or neuritis, in connection with the requisite predisposition, will, in most cases, be followed by an eruption of zoster.

Symptomatology.—Zoster resembles the eruptive fevers, in that it is preceded by a prodromal period, and the length of this period is unknown. The prodromal symptoms are: more or less itching along the track of the inflamed nerve, neuralgic pain of greater or less intensity, fever, restlessness, loss of appetite and intestinal irritation. Three or four days after these symptoms are noticed, the eruption makes its appearance in the form of fine vesicles situated on patches of inflamed skin. These inflamed patches vary in size and shape; they may be about the size of a silver half-dollar or as large as a small saucer, while between these inflamed areas the skin remains normal.

In children, in the so-called infantile zoster, there is seldom any neuralgia, and the only disturbance which may be noted is the zosterian fever, with some gastric distress.

The vesicles, at first, are fine and transparent, being filled with a clear, colorless serum; but in a few days they increase in size, lose their transparency, and become yellow and turbid. They last from seven to twelve days, and if their contents have not been evacuated, they either dry up after the serum has been absorbed, or else form little scabs, which soon fall off.

When the vesicles have disappeared, the red and inflamed patches, by a gradual subsidence of the redness and inflammation, soon return to their normal color and condition. For some time after the skin has regained its normal condition, there still remains the acute neuralgic pain, though less in severity, and this pain is very annoying until it finally disappears. The eruption may appear simultaneously at the opposite ends of the nerves, and by successive formation of new vesicles and patches, gradually approach, until they finally coalesce. It rarely appears a second time in the same subject, one attack generally securing complete immunity against another.

Diagnosis.—Zoster, from its characteristic symptoms, can hardly be mistaken for any other skin disease, but it is sometime confounded with herpes, and may be differentiated as follows: herpes has a tendency to recur and generally appears on both sides; zoster rarely, if ever, appears twice in the same subject, and is usually unilateral; herpes follows in the wake of some catarrhal affection of the mucous membranes, and in most cases, is confined to the face and genitals; zoster is due to some neuritis, and follows the course of some nerve or nerves; herpes is preceded and accompanied by a burning itching, and never leaves cicatrices; zoster is attended by a more or less severe neuralgic pain, and often leaves scars to mark the site of the eruption.

Prognosis.—As zoster is not of itself a dangerous or fatal disease, the prognosis is always favorable. Children usually

recover rapidly, and neuralgia, even if present during the attack, is seldom persistent, as it is apt to be in adults and especially in the aged.

Treatment.—The first indication in the treatment of zoster is the alleviation of the pain, and this is best accomplished by the use of the galvanic current. The current should be used as strong as can be borne, or about six cells, and should be applied from ten to fifteen minutes daily. The local treatment consists of protecting the vesicles from external irritation, by coating them with flexible collodion or traumaticin, cantharides ointment, or dusting over them equal parts of starch and subnitrate of bismuth, and then over this applying a roller bandage.

The indications for the remedies are as follows:

Rhus tox.—Sleeplessness, with restless tossing about; vesicles are confluent, small, painful, burning and surrounded by red skin; pain aggravated by scratching; worse in cold weather; disease brought on by getting wet while overheated.

Arsenicum.—Intense burning pain; vesicles confluent and very small; intense, cutting, burning neuralgia; great thirst and exhaustion; aggravated at night and by cold applications.

Graphites.—Skin dry and with a tendency to ulcerate; large vesicles following course of intercostal nerves; burning when touched, and worse from warmth; zoster of left side.

Mercurius.—Vesicles involving greater part of one side of abdomen, especially the right; tendency to suppuration; aggravation at night, and from warmth of bed.

Zinc.—Acute neuralgic pains; aggravation at night and after eating; better from being handled.

Zinc phos.—After other remedies have failed, often works wonders.

CHAPTER VI.

ERYSIPELAS (ST. ANTHONY'S FIRE).

Definition.—Erysipelas is an acute, contagious, specific inflammation of the skin and subcutaneous connective tissue, characterized by an eruption or deep-red rash, accompanied by a peculiar pungent, burning pain, and heat and swelling. A great, or marked, characteristic of erysipelas is its tendency to spread and infect other portions, the primary seat healing, while the newly invaded surface is becoming affected. The disease is variable both as to its extent and severity; and according to its extent and severity, it will terminate in resolution, suppuration or gangrene.

It is rarely ever met with in childhood, and when such cases are seen they present no differences, or at least have nearly the same features, as the disease when occurring in adults; but on the other hand it is a common affection during infancy, especially common in infants under six months of age; for in forty consecutive cases occurring in infants, twenty-seven were under six months, eight between six and twelve months, and the remaining five over twelve months. The disease as seen during this period, presents quite a number of distinctive features that differ materially from that which occurs in adult life.

It is seldom met with in families in easy circumstances, but is very common among the poor, where proper attention is not devoted to the requirements of cleanliness; and in crowded houses, especially in lying-in hospitals, children's homes and foundling asylums.

The course of the disease is often irregular, and the physician may be priding himself on the apparent success of his treatment, when suddenly it will break out again with renewed vigor, reinfecting the lately healing parts, set up a more virulent inflammation than before, and speedily carry off the patient from exhaustion. Thus it will be seen that one attack is no security against another, but, rather, leaves the system in a debilitated state that is susceptible to a reinfection of the disease.

In the adult, the favorite point of infection is undoubtedly the head or face, while in infancy they are seldom starting-

points. In thirteen out of twenty-six cases occurring in female children, the point of invasion was the vulva, while in fifty-eight cases of both sexes, thirty-four, or sixty per cent., the vaccination site was the commencement, and from this it is evident that the vulva and vaccine pocks are the favorite places of invasion, while the male genitals are rarely the beginning, as are also the arms, legs, nates and feet.

Etiology.—Erysipelas must be regarded as a specific disease, inasmuch as it depends upon the entrance into the system of a specific micro-organism, called the *Streptococcus erysipelatis.*

This pathogenic micro-organism spreads by the lymphatic channels of the skin, penetrates into the tissues, forms chains or swarms of cocei, and excites a specific inflammation and leads to tissue necrosis.

The causes that favor the development of erysipelas have by common consent been divided into two classes, *viz.:* predisposing and exciting.

The most powerful predisposing cause of this malady in the abstract is *traumatism.* It is mostly a disease of the temperate zone, and occurs more frequently in the colder than in the warmer months of the year. It is particularly prevalent in damp, changeable weather, with unstable temperature.

Uncleanliness and improper food, living in damp, dark, crowded and illy-ventilated rooms, and especially overcrowding in hospitals, as during the existence of other epidemics, furnish conditions favorable to the development of the disease. It spreads for the most part by direct contagion, and when once established in a house or in a public institution, it may develop upon even the most trivial break of the surface—abrasions, fissures, etc.—in susceptible individuals.

Vaccination is one of the most prolific of the exciting causes, and often the abrasion and the inflammation, which necessarily arise around the point of operation, are the cause of it, and not any deleterious quality contained in the virus, as is supposed by many; and this is well borne out by the fact that the inflammation involving a burn or wound, may be followed by similar results. In children, on account of the difficulty of dressing and caring for operations, the wounds, in most vaccinations, are followed by some degree of erysipelatous inflammation.

When occurring in the very young, it is principally associated with the separation of the cord. It often follows closely upon some other inflammatory condition of the surface, as the irritated folds of the skin in intertrigo, etc., or when the thin portions of the cuticle are fissured, as at the corners of the eyes, nostrils, mouth, arms and vulva. *Arnica, rhus tox., belladonna,*

and other drugs, whether used externally or internally, will, if used in sufficiently large doses, set up an attack of this disease. From the greater percentage of cases that have their origin at or near the vulva, it may be readily inferred that female children are more liable to it than the male.

In his "Treatise on Diseases of Children," Dr. Condie says of the connection of puerperal fever and erysipelas: "Erysipelas of infants very commonly occurs during the prevalence of epidemic puerperal fever. Children of mothers who become affected with the fever are often born with erysipelatous inflammation; others are attacked almost immediately after birth. Whether, in these cases, the disease is to be referred to a morbid matter applied to the skin in the womb, or to the same epidemic or endemic influence which gives rise to the disease of the patient, it is difficult to say. According to M. Trousseau, infantile erysipelas is principally observed when puerperal fever prevails in the wards of the lying-in hospitals in Paris."

In private practice, few cases of infantile erysipelas, associated with erysipelas in the mother, are met with, but when puerperal fever and erysipelas are epidemic it occurs more frequently.

That the disease is spread by carelessness in the handling of infected subjects and the dressings, direct contagion and inoculation, is well known; and as the disease is so highly contagious, all patients suffering from it should be isolated as much as possible, the dressings and bandages destroyed immediately after removal, and the nurse should disinfect herself before coming in contact with other members of the family.

Symptomatology.—Infantile erysipelas is in some cases preceded by an incubative stage, but these are few in number, and this, with the lack of facilities for observation, makes it almost impossible to determine the length of this stage. It is usually ushered in with slight rigors, drowsiness, or, in some cases, extreme restlessness, twitchings of the flexor and extensor muscles, increased temperature, rapid pulse, and sometimes, nausea and vomiting. With the onset of the eruption all the symptoms intensify; and, in the majority of cases, there is extreme restlessness caused by the peculiar pungent, burning pain accompanying it. When it appears the fever increases, sometimes as high as 104° or 105°, or even 106°, pulse very rapid, often 160 to 180 per minute; there is considerable thirst, stomach is irritable, bowels irregular and frequently in a diarrheic condition, the face is flushed, the entire cutaneous surface is hot to the touch, the tongue is furred, and sleep is impossible from the burning pain. In the severe cases convulsions have been observed, but as a rule they do not occur.

If it occurs at or near the umbilicus, or in the neighborhood of the inflamed patches of intertrigo or vaccinations, it spreads very rapidly, the invaded skin becoming infiltrated and swollen, and at the points of most intense inflammation, vesicles may form, and these points may be followed by gangrene with sloughing of large areas, but, most frequently, they terminate in desquamation.

Peritonitis is a complication quite common when the umbilicus is the point of infection. This is a result of perforation of the abdominal wall by the gangrene and sloughing induced by the severity of the inflammation. The peritonitis is septic and is usually, and often very quickly, fatal.

Abscesses may occur and remain in an inflamed condition some time after all traces of inflammation in the surrounding skin have disappeared. If situated at or near the umbilicus, they should be carefully watched, for if they discharge into the peritoneal cavity, serious results will follow.

The great characteristic symptom of erysipelas is its tendency to spread, and, unlike other diseases, instead of one attack immuning against another, it predisposes the skin to a repetition, and these facts should be borne carefully in mind, and the case followed some time after all symptoms have ceased, for it may suddenly be relighted in a more malignant form and speedily carry off the already exhausted little one.

The duration of the disease varies with the intensity of the inflammation. If the attack be light and uncomplicated, the inflammation usually lasts from seven to ten days, but some cases may be prolonged for months. In fatal cases, however, death occurs on an average of twelve days after the appearance of the eruption, and in most of them death occurs from exhaustion.

Diagnosis.—In the earliest stages, the diagnosis of erysipelas is an impossibility; but when the eruption appears, the peculiar burning pain, the characteristic spreading, etc., are sufficient to decide the diagnosis. It closely resembles erythema, scarlet fever, herpes, zoster, and eczema; but a delay of a few hours or even a day, will be rewarded by enabling a positive diagnosis to be made.

Prognosis.—Age has a great influence in the prognosis of this disease. In very young infants it is almost always fatal. When occurring in babies between the age of one and six months, the prognosis should be guarded, but in infants over six months, and the attack being light, it may generally be pronounced favorable. However, with the tendency of the disease to recur in severer forms, and in already over-taxed patients, the prognosis should, in all cases, be guarded, and this is

especially true when those who are naturally weak and debilitated are affected.

Treatment.—When a positive diagnosis has been made, prompt measures should be taken at once to prevent its spread, and this is best accomplished by either bandaging the diseased portions, or removing the patient to a room where it can be isolated from other members of the family. In all cases, no matter how simple, strict antiseptic precautions should be observed, both to prevent auto-inoculation and otherwise spreading the disease.

The first and most important consideration in the treatment is, if possible, to prevent the disease from spreading, and invading other portions of the skin. Various methods have been advocated for the purpose of circumscribing the inflammation, and in our estimation the best in use, at the present, is the application of the tincture of iodine. This is accomplished by painting a circle of the tincture, an inch in width, around the margins of the inflamed area.

Irrigating the invaded surfaces with antiseptic washes, or the application of cold compresses of *calendula*, *hamamelis*, *hydrastis*, *veratrum viride*, or of weak solutions of *carbolic acid*, *mercury*, etc., will relieve the burning pain and irritation; while rye or buckwheat flour dusted over the diseased patches is very cooling.

If the child is weak and poorly nourished, some one of the various infant foods, that after repeated trials is found to agree with the patient, should be given. If the bowels are irregular, they should be attended to and restored to their normal condition. A change from the crowded and illy-ventilated tenement houses to a place where more room, sunlight and freedom can be obtained, will be highly beneficial. If the disease is consequent upon a vaccination, washing with a two-per cent. solution of *carbolic acid* and dressing with *hydrastis*, with the internal administration of *ars.*, *bell.*, or *rhus tox.*, whichever is best indicated, will be followed by a prompt improvement. When abscesses threaten, *belladonna* will, if administered in time, abort them; otherwise, they should be encouraged to point, by *heat*, *hepar sulph.*, etc., and then opened freely with a bistuory. For the further consideration of those cases that require surgical treatment, the reader is referred to the standard homeopathic works on surgery.

Following are the indications for the remedies:

Rhus tox.—Great restlessness and uneasiness; twitching and jerking of the muscles; itching over the whole body; stools, thin, loose and dark brown; pulse very rapid, small and weak; fever with chilliness; worse at night; vesicular eruption.

Apis.—Skin swollen, dry and mottled; eruption intense, deep red, and accompanied by severe stinging, smarting pains; edematous swelling of the extremities; stools copious, yellowish, and occur with every movement of the body; pulse small, rapid and wiry; fever without thirst; tongue furred.

Arnica.—Face and eyes sunken; tongue coated white; vomiting of food, no appetite, great thirst; diarrhea, stools involuntary, while asleep, undigested, painful, causing patient to scream and cry out; skin red, hot and painful, edematous; inflammation of skin and cellular tissues, very painful to the touch; feet and hands cold, but body very hot.

Arsenicum.—Great restlessness; violent thirst; vomiting; diarrhea, stools black or dark green, offensive and excoriating; skin cold and clammy, with gangrenous aspect; exudation of thin, colorless, acrid, very offensive fluid; typhoid symptoms.

Belladonna.—Convulsions; eyes widely dilated; violent throbbing of the carotids; face red and hot; excessive thirst, vomiting, tongue white with red edges; stools slimy, with offensive odor; skin red, hot and shining; eruption smooth, red and hot; great sensitiveness of entire skin; pulse full, hard and rapid; high fever, with rigors.

Cantharis.—Vesicular eruption, burning and stinging; child cries, screams or has spasms when urinating; especially useful after the too free use of *arnica* externally.

Lachesis.—Eruption becomes dark blue, black or mottled; gangrene; ulcers foul and angry looking; convulsions; restless tossing about, with moanings; thirst, loss of appetite, and vomiting; stools sudden, copious, watery, dark and very offensive; pulse rapid and irregular.

CHAPTER VII.

IMPETIGO CONTAGIOSA (PORRIGO CONTAGIOSA).

Definition.—Impetigo contagiosa is an acute, contagious inflammation of the skin, characterized by an eruption of vesicles and pustules, and accompanied by more or less pruritis. The vesicles and pustules are minute points appearing in clusters or patches, or else scattered singly over the surface. When occurring in patches, the vesicles and pustules are closely aggregated, and when broken and their contents discharged, one large crust or scab is formed, which varies in size from a split pea to a common marble. This crust is yellowish or straw-colored, has ridges and excavations on the surface, giving it an umbilicated appearance, and looks much as if it was "stuck on" the skin.

The pus from the pustules is highly contagious and is also auto-inoculable. The disease is spread by direct contagion and by inoculation. It occurs mostly on the extremities, but is frequently seen on other portions of the body. When occurring on the arms the pustules are smaller and rounded, while those on the lower extremities are large and more elliptical.

Etiology.—Impetigo contagiosa is chiefly seen among the poor, and is most frequent in children under seven years of age. It is due to the inoculation of contagious pus, independently of its source. The staphylococcus awrens is the most common pathogenic organism of this affection. Kissing, as between children and parents, may carry the disease, and not uncommonly several cases are met with in the same family.

Symptomatology.—The eruption is usually preceded by a period of incubation which lasts from three to five or six days. The prodromal symptoms are: fever, rapid, small, weak pulse, loss of appetite, diarrhea or constipation, restlessness and sleeplessness. After the third day the eruption generally makes its appearance, consisting of numerous fine vesicles situated on an inflamed surface, having well-defined margins. When first formed the vesicles are very small but rapidly enlarge and develop into pustules. They are slightly raised from the surface, and, at first, are filled with a transparent fluid, which in a few days undergoes suppuration.

Soon after the formation of the pustules they break and their

contents are exuded over the skin, where the pus slowly forms thick, yellow scabs or crusts, while from under the edges of which the undried pus is being constantly exuded.

In mild cases the eruption is limited in extent, but in severe cases, and especially those that have been neglected, the entire extremity or extremities may be involved to such an extent as to have its motion and utility interfered with. When the extent of the eruption is very great, there are generally numerous cracks or fissures in the crusts, through which pus is constantly exuding, and, drying on the old scabs, tends to increase their thickness to an enormous extent. It often happens that the nails are involved when the eruption has extended to the hands and feet, and, when so involved, they usually drop off and are replaced by irregular and distorted new ones.

With the appearance of the vesicles, a sensation of heat, itching and smarting is felt, which varies in degree, according to the mildness or severity of the inflammation, and the extent of the eruption. The duration of the disease varies with the subject, lasting in some two weeks, while in others it may be prolonged, by auto-inoculation, for six and even eight months.

After their formation, the crusts generally last from ten to fourteen days, when they begin to exfoliate. When they have loosened and fallen off, the healing process is unhindered and proceeds very rapidly, beginning at the center of the patch, and gradually working towards the circumference. In some cases, a few, small, round, elevated spots, situated on red patches, are seen after the crusts have exfoliated, but they soon disappear.

Diagnosis.—Impetigo contagiosa is most liable to be confounded with eczema, scabies and varicella. It can be diagnosed from pustular eczema by the fact that the eczematous eruption is more confluent, excites intense itching, and is usually associated with inflammation and infiltration of the surrounding skin; from scabies by the multiformity of lesions, the intense itching, and the presence of acari, in the latter, and from varicella by the more numerous and smaller lesions of chicken-pox, and their distribution over almost the entire body.

Prognosis.—The prognosis is generally good. Under favorable conditions the disease will terminate spontaneously in two or three weeks. It may be prolonged for an indefinite period by auto-inoculation, but is never dangerous to life.

Treatment.—As the disease is so highly contagious, means to prevent the patient from scratching, as well as its spreading, should be taken at once; and this is best accomplished by gently pressing out all the pus, removing the crusts with warm carbolic acid solutions and applying antiseptic compresses.

After the removal of the crusts, the raw and inflamed surfaces should be anointed with some emollient substance, such as olive-oil, vaselin, etc. If the case is a mild one, this is all the treatment that will be necessary; but in severe and extensive cases the constitutional symptoms demand attention.

The diet should be carefully looked after, and the patient, if exhausted, given a stimulating and highly-nourishing diet. Absolute cleanliness is indispensable, as is also plenty of good, pure, fresh air, and sunshine. The crusts should be removed as fast as formed; and if there is much pruritis, dusting the surface with equal parts of starch and zinc oxid (the greater the extent of raw surface, the more starch in proportion to the zinc should be used), or buckwheat flour will be very effective. Good results often follow the use of an ointment consisting of five per cent. of resorcin in equal parts of lanolin and vaselin. In all cases the discharges should be removed as they form.

The remedies are indicated as follows:

Antimonium crud.—Nausea, vomiting; no appetite; vesicles and pustules burn and sting; eruption mostly on face, with brown, scurfy skin between the patches.

Antimonium tart.—Excessive restlessness; child trembles all over; weakness and prostration; eruption, pustular, thick, and as large as a pea; eruption leaves painful, bluish-red marks on the face.

Kali bich.—Extreme weakness; restless; pains shoot from one patch to another; nausea, worse in morning; pustular eruption confined to forearms; pustules are round and regular in shape, and very painful.

Thuja.—Trembling of the upper extremities; emaciation and weakness; burning stitches in various parts; very restless; sleeplessness; eruption mostly on lower extremities; especially useful when the disease occurs after vaccination.

CHAPTER VIII.

URTICARIA (NETTLE-RASH; HIVES).

Definition.—Urticaria is a non-contagious, inflammatory condition of the skin, characterized by an eruption consisting of rapidly-formed evanescent wheals of a whitish or reddish color, accompanied by more or less burning, tingling and itching.

The lesions vary in size from a quarter to one inch in diameter, occur in patches, and are distributed here and there over the cutaneous surface. The number of wheals varies on different parts of the body, being most numerous on the arms; and it is more their size and not their number, that gives size and extent to the patches.

These patches are surrounded by inflammatory zones, which have well-defined margins; and the inflammation varies in severity, as does also the accompanying pruritis and burning, according to the extent of these patches. The inflammation rarely lasts any great length of time, generally disappearing entirely in forty-eight hours, while even in some cases the process may have ceased in an hour. All symptoms usually disappear in five or ten days.

The characteristics of the wheals presented to the eye are their red, white, or reddish-white color, their varying size and irregular shape, their occurring in patches, and the well-marked border of inflammation surrounding the patches; while to the touch, they are hard and elevated somewhat above the surface of the skin, and their surfaces are uneven. To the eye and touch, they are almost identical with the wales produced by a strong blow with a switch on the skin. The common name of urticaria is nettle-rash, while it is sometimes called hives.

Etiology.—The causes of urticaria may be divided into two classes, *viz.:* predisposing and exciting.

The most important among the predisposing causes, is a weak and delicate skin, that, under each and every irritation, no matter how slight, is ever ready to take on some form of inflammation, and this inflammation, acting in conjunction with proper exciting causes, will eventually become an urticaria.

This susceptibility of the skin is so marked in some children, that even the taking of certain substances into the mouth will

cause an eruption of the disease, and we can cite a case of a ten-year-old boy, who, at one time, had no sooner taken a piece of strong cheese into his mouth, than his face became intensely red, and this hyperemia was soon followed by wheals, which lasted nearly thirty-six hours, when they finally disappeared.

Anger, fright, or some other intense mental excitement has produced it. Seasons also have considerable influence in its causation, as the majority of cases occur late in spring or early summer. Excessive clothing, over-heated rooms and too frequent bathing produce a tendency to its appearance.

Among the exciting causes that are to be mentioned first, are those that act from within. The most important of these are such substances that, when taken into the irritable stomach, nearly always found accompanying a delicate skin, will set up reflex action and irritate the skin; such substances are *belladonna*, *bromin*, *cantharides*, *iodin*, *rhus tox.*, *turpentine*, etc., and in addition to these are to be mentioned, rich pastry, highly seasoned foods, strong cheese, lobsters, oysters, crabs, canned and salted fish and meats, pickles, strawberries, oily nuts, olives and other fatty foods. Worms and chronic intestinal catarrh are common causes in children.

The exciting causes acting from without are: various mechanical injuries, such as falls, blows, bruises, whippings; tight clothing and shoes; irritations of orthopedic instruments; bites of different insects, as fleas, mosquitoes, bed-bugs, spiders; stings of bees, wasps, hornets, etc.; and some drugs applied externally. The most common external cause is the scratching induced by itching from whatever source. It may exist in connection with other skin diseases, and, when so existent is the result of the scratching; while in some cases it may be so extensive as to entirely mask the primary disease, making diagnosis of that affection impossible.

Symptomatology.—Urticaria, when occurring in the adult, is ushered in with high fever and more or less febrile disturbance; and it is this that distinguishes urticaria occurring in the adult from that which occurs in infancy, for the latter has no fever and only slight febrile movement. The onset of the eruption is generally preceded by symptoms of headache or congestion, great restlessness, weakness and languor, vomiting, variable condition of appetite and bowels, tongue thickly coated white, and irritableness. In some few cases there are no prodromic symptoms, the eruption being ushered in with a most intense pruritis and burning which causes the child to lose all self-control and give way to paroxysms of scratching.

The eruption consists of papules or small tubercles about the size of a split pea, and of a red or white color. The papules

are congregated in groups or clusters, of a dozen or more, and are surrounded by bands of inflammation with well-defined margins; and these patches vary in size, are irregular shaped, and are distributed over the surface either singly or in clusters. When the patches occur in clusters, the papules have a tendency to coalesce and form one large wheal, which is generally of a greater length than breadth.

The extent of the eruption varies in different individuals, but it is usually limited to the face, arms, back and thighs, although it may involve the entire skin. In the center of the papules are white spots, which, when punctured, exude a thin colorless fluid. The eruption rarely lasts over forty-eight hours, and ends in a slight desquamation. The papules that are first formed do not last long, but disappear in a few hours, and are replaced by others, on different parts of the body or on the same site. So fugitive is the character of the eruption, that by the time the physician responds to the first call, it may have entirely disappeared, leaving only the marks produced by the scratching. The wheals, when ruptured by scratching, bleed slightly, which, drying, form little scabs on their apices.

Diagnosis.—The diagnosis of urticaria is exceedingly easy, as it can hardly be mistaken for any other disease. The evanescent character of the eruption, the agonizing pruritis, and the hard, elevated, white or red wheals are met with in no other skin disease. Dermatitis contusiformis, however, has many of the features of urticaria, but it can be differentiated by the regular course, intense hyperemia, regularity of shape of nodules, and the entire absence of pruritis of the dermatitis.

Prognosis.—There are no cases on record, where death has been the direct result of urticaria. It is an exceedingly mild disease, and the prognosis is always favorable, although among the poorer classes, where proper hygienic measures cannot be enforced, the disease may be prolonged indefinitely. It has no dangerous symptoms, and when such are present, are always dependent upon the gastric disorder or whatever produced the disease. The papular form in children often proves very obstinate.

Treatment.—The first and most important point in the treatment, is the removal, if possible, of the cause of the eruption. If it be the result of an over-loaded stomach, the stomach should be emptied by a gentle emetic. If due to diarrhea or constipation, the bowels should be carefully attended to and returned to their normal condition. All errors of diet, clothing, etc., are to be corrected. If, for some reason, the child is in a constant state of nervous tension, steps to the removal of the nervousness should at once be taken, and the child kept as

quiet as possible. When occurring in little boys with phymosis, they should be circumcised immediately, the sooner the better. In little girls, the hood of the clitoris, if adherent, should be loosened, and all smegma thoroughly removed. If due to a filthy condition, whereby body lice are contracted, absolute cleanliness should be insisted upon, which will, in most cases, be destructive to the lice.

After all causes have been removed, the attention should be directed to the alleviation of the pruritis, and this is best accomplished by irrigation with some alkaline or antiseptic solution. If the eruption be simply local or of small extent, two per cent. *carbolic acid* or *bi-chlorid mercury*, one to two thousand may be used. If the skin be unbroken, the patches may be washed with warm salt water. Buckwheat or rye flour, or equal parts of oxid of zinc and starch, dusted over the patches, has a decided anti-pruritic action.

In all cases, strict cleanliness should be observed, and the diet carefully watched, so that if the eruption is due to some improper food, that article can be detected and at once removed from the child's regimen. If the patient be weak and debilitated, a good stimulating as well as nourishing diet should be ordered and given in such quantities as best suits the demands of the system. Outdoor exercise and plenty of fresh air and sunshine are very beneficial.

The remedies are indicated as follows:

Apis mel.—Tired, weak, languid, with trembling of the limbs; the eruption stings and burns like stings of bees, wasps, hornets and other insects; eruption intensely red, and pruritis worse at night; eruption spread over nearly entire body.

Arsenicum alb.—Intense thirst, great restlessness and sleeplessness; eruption of a deep-red color, and confined to face and arms; the eruption burns, is exceedingly painful, and is aggravated by scratching; wheals greatly enlarged by scratching.

Belladonna.—Symptoms of congestion of head; tongue red, with white streak in center; skin hypersensitive; eruption of a bright-red color, surrounded by deep-red border; burning and itching comes and goes periodically and suddenly.

Calcarea carb.—Child weak, muscles flabby, and skin very unhealthy; eruption tends to become chronic; the eruption is hard, very light colored, elevated and situated on white surface, and disappears on going out in open air.

Cina.—Digging and scratching at the nose; twitching and jerking of the muscles; eruption first appears about the nostrils and from there spreads over face and back; eruption from worm troubles.

Conium.—Child takes cold very easily; is weak and easily

exhausted; eruption mostly on back and thighs; pruritis and stinging like bites of insects; aggravation at night and from scratching.

Graphites.—In weak, thin, poorly-nourished children; the eruption is spread over entire body; itching and burning aggravated by scratching and at night; sour-smelling perspiration when warm in bed, or skin is dry with tendency to fissure.

Podophyllum.—Tongue heavily coated white; diarrhea, with dark-green, watery stools, passed with much flatus; is very sleepy during the morning, but wakeful at night; eruption confined to back and arms; intense pruritis unrelieved by scratching; eruption aggravated by scratching.

Pulsatilla.—Eruption caused by eating pastry, fatty foods, highly seasoned articles, etc.; itching very evanescent, rapidly shifting from one spot to another; eruption is red, elevated and very hot; scratching slightly relieves pruritis, which is aggravated from warmth of bed.

Ruta.—Nausea and vomiting brought on by drinking milk; constipation with rumbling in bowels; eruption brought on by eating meat; intolerable pruritis all over the body, aggravated by cold air, but relieved by scratching.

Sulphur.—Weakness and languor; aversion to washing; offensive smell from child who is exceedingly dirty; eruption frequently due to body lice; eruption on whole body; burning and itching relieved by scratching, but worse from warmth of bed; especially useful in chronic cases.

Zinc met.—Child dull, stupid and greatly emaciated; muscles twitch and jerk; itching seems to be between skin and flesh; the eruption appears immediately after eating or taking a bath.

CHAPTER IX.

TRICHOPHYTOSIS (RINGWORM).

Definition.—Trichophytosis is a contagious affection of the skin due to the development of the trichophyton fungus in the hairs, hair-follicles and epidermis.

As observed in children, it may be most conveniently described under the regional forms of trichophytosis corporis or ringworm of the general surface, and trichophytosis capitis or ringworm of the scalp.

Etiology.—Trichophytosis is caused by the trichophyton, a vegetable parasite which consists of spores and mycelia, but especially of spores. It is highly contagious, and is readily communicable, either directly from one person to another, or through the medium of wearing apparel, or of the various articles of the toilet.

It is met with in the horse, dog, cat, cow, rabbit, and other domestic animals, and may be transmitted by them to man.

Trichophytosis capitis is most common in fair-haired, poorly-nourished children. It is seldom met with in infancy, or after puberty.

Trichophytosis corporis may occur at any age, but is uncommon after fifty. It is of more frequent occurrence in children than in adults.

Symptomatology.—Trichophytosis corporis is more common upon the face, neck, arms and exposed parts, but may appear upon any part of the body. It begins as a small, light-red, slightly scaly spot, presenting a circular, sharply-defined, slightly elevated border, which may be either papular or vesicular. As the spot increases at the periphery, it frequently displays a tendency to clear up in the center, and the lesion assumes a ring-shape appearance. Not infrequently pale-red, circular, well-defined, scaly patches, which extend centrifugally, but do not clear up in the center, are observed to take the place of, or occur in connection with, the more typical ring formations. The patches or rings may be one or several, ordinarily but two or three are present. They may attain the size of a half inch or larger, and may remain separate or coalesce and form gyrate or crescentic figures. They give rise to but little

physical discomfort, other than slight itching, and may continue for days, weeks, or months, if allowed to remain untreated.

Ringworm of the body may coexist with ringworm of the scalp.

Trichophytosis capitis is almost exclusively confined to children. Not infrequently it prevails in schools and public institutions as an epidemic. It begins around a hair, as a red point which increases peripherally, and soon becomes a well-defined pale or grayish-red patch, covered with fine, white scales. Usually attention is first directed to the affection by the presence of one or more, generally circular, variously-sized patches with sharply-defined borders, covered with ashen-gray scales and stumps of dull, lusterless hair. It may remain limited to one or more spots, or invade the entire scalp. Sometimes it becomes disseminated, and may then readily escape detection, as the scaliness is slight and the stumps are few. Occasionally it shows a tendency to spread beyond the line of the hair and down upon the adjacent uncovered skin. After it has existed for some time the patches may assume a bluish or slate-colored appearance. Itching in various grades of severity, though usually mild, is commonly present.

Early in the disease, the hairs undergo alterations, and become bent, twisted and brittle. The broken hairs are of a lighter color than the neighboring healthy hair, and their extremities are ragged and often brush-like. In very fair, fine-haired children, the hairs, instead of sticking up, are apt to lie close to the skin, and appear thickened and matted. On attempting to extract the short hair-stumps with the epilation forceps, it will be found that many of them break off, leaving the root in the follicle. Under the microscope, with the power of three or four hundred diameters, an extracted hair-stump, after being soaked in a few drops of liquor, and then potassæ, will be seen to be stuffed with the minute spores of the trichophyton. The ashen-gray scales of the affected scalp are found to exhibit traces of the fungus, though to a less extent than the invaded hairs. The hair-shaft is often longitudinally split, the growth of the parasite having forced the elements apart.

Trichophytosis capitis may be either acute or chronic, and when left to itself it may persist indefinitely.

Pathology.—The seat of the trichophyton fungus is in the hair, hair-follicles and epidermis, where, by its development, it produces the various clinical appearances of the disease.

Diagnosis.—The diagnosis of trichophytosis, in typical cases, is usually easy. The peculiar clinical features in ringworm of the body, especially the rapid development of the circles, with a tendency to clear up in the center, and the presence of bent,

broken and twisted hair-stumps in ringworm of the scalp are sufficiently characteristic. In all forms, the discovery of the trichophyton fungus in the scales and hairs will establish the diagnosis with certainty.

The only diseases with which it is liable to be confounded, are seborrhea, psoriasis and alopecia areata.

In seborrhea the scaliness is diffuse, and the thinning of the hair, when present, is general, and there are never any broken-off hair-stumps.

In psoriasis the scales are more abundant than in trichophytosis, the patches are more symmetrically distributed, and there are never any short stubbly hairs.

In alopecia areata the hairs fall out entire, leaving patches or bands of perfectly bald, smooth, white skin. Where there is doubt, recourse must be had to the microscope.

Prognosis.—While the prognosis in all forms of ringworm is usually favorable, it should be guarded as to the length of time required to affect a cure. Trichophytosis corporis is generally curable in one or two weeks, while trichophytosis capitis is rarely cured within four or six months.

Treatment.—The treatment of trichophytosis, when the disease is superficial, as in ringworm of the body, is easy and promptly curative ; while that of ringworm of the scalp is tedious, owing to the mechanical difficulty of carrying the parasiticide deeply enough to reach the fungus in the hair-follicles.

In trichophytosis corporis the scales should be removed with soap and hot water, and the lesions well rubbed twice a day with almost any antiparasitic ointment, preferably one composed of sulphur one drachm, carbolic acid twenty minims, lanolin five drachms, and olive oil three drachms ; or an ointment of ammoniated mercury, fifteen to forty grains to the ounce of lanolin and olive oil or lard. A few applications of tincture of iodin or of dilute acetic acid often prove effective. Ordinary writing-ink, and a copper cent that has lain in vinegar, are valued remedies among the laity.

In trichophytosis capitis the hair should be cut short for at least a half inch all around the affected spot or spots, the scales cleaned from the scalp, and the diseased hairs extracted by means of a properly constructed epilation forceps. The parasiticide, preferably a bi-chlorid of mercury solution, one to three grains to the ounce, or an ointment of the oleate of copper, a half drachm to one drachm to the ounce should be immediately applied, and well rubbed in twice a day.

Electric cataphoresis may be employed with good results, using a one per cent. bi-chlorid of mercury solution in connection with the anode.

Epilation should be repeated weekly, and local treatment continued as long as necessary. The strictest attention should be given to cleanliness, and all bonnets, hats, caps or other head-gear, as also hair-brushes, combs, etc., that have been previously used, should be destroyed. In schools and public institutions the separation of affected individuals and of their clothing, should be rigidly enforced, in order to prevent the further spread of the disease.

The most important internal remedies are *sepia* and *tellurium*. Others occasionally of service are: *arsenicum, alb., calcarea carb.*, and *sulphur*.

CHAPTER X.

SCABIES (ITCH).

Definition.—Scabies is a contagious disease of the skin caused by an animal parasite called the acarus scabiei. The disease is characterized by the formation of vesicles and pustules situated on inflamed bases, and also by the intense nightly aggravation of the itching.

Scabies, though common in Great Britain and on the Continent, is a comparatively rare disease in this country, constituting, in my experience, only about two per cent. in private practice.

As soon as the acari have alighted on the skin, they immediately proceed to burrow, the male going only deep enough to secrete himself under the scales of the superficial stratum, while the female constructs a long, tortuous canal or cuniculus in which she deposits her eggs as she advances. After she has finished laying her eggs, she remains at the end of her cuniculus, where, in a few weeks, she dies, unless removed or killed by treatment sooner.

On the tenth day, the ova are hatched, and as soon as the young acari mature, they seek the surface, where the young females become impregnated, and they in turn begin burrowing and laying eggs as they advance. These canals or cuniculi are in appearance much like a needle scratch, and have at one end a fine, white, glistening point, which can be easily removed with a fine needle, and these points, placed under a microscope, prove to be the female acari. The male acarus never burrows, and is very rarely detected. The female acari, by burrowing, produce the itching; and being more active at night than during the day, give rise to the nightly aggravation. The inflammation, vesicles and pustules are caused by the scratching.

Etiology.—Scabies is the most contagious of all the skin diseases. It requires no particular susceptibility of the cuticle to its influence, but may be transmitted by direct contact with the disease, by sleeping in bed with an infected person, or by wearing the clothing previously worn by a diseased subject.

It is mainly a filth disease, and is much more common among the poor and those who are careless of their personal cleanliness, than among the better classes. In the poorer classes,

where cleanliness is almost entirely neglected, and the people live in crowded and poorly-ventilated houses, the means of communication are particularly numerous, and it is among these classes that the majority of cases of scabies occur.

The principal etiological factor of the disease is the acarus scabiei. This parasite, or evidences of its being present, is found in every case of scabies, and its cuniculus is one of the diagnostic symptoms of the disease. The acarus is shaped much like a turtle. The neck is long and can be elongated or retracted; and the head is provided with two jaws. A full-grown acarus has four pairs of legs, two anterior and two posterior; the anterior pairs being articulated and armed with suckers, while the posterior pairs are covered with hairs. On the back are numerous fine spines or projections pointing upward and posteriorly, which effectually prevent the creature's retrogressing. The young acari have but six legs.

Symptomatology.—The period of incubation of this disease varies according to the degree of healthfulness of the child, and lasts from two to five days. In healthy children the eruption usually appears about two days after the exposure, while in sickly and poorly-nourished infants it does not appear for four or even five days.

The first noticeable symptom is a more or less redness of the skin of the part exposed. This redness is soon followed by a true inflammation and with the formation of minute pearly vesicles, and accompanied by intolerable itching. Frequent scratchings rupture these vesicles and their contents are exuded over the skin. This fluid is highly contagious, and being carried to the surrounding surface, sets up a new inflammation with vesicles, and in this way is the disease extensively and rapidly spread.

The vesicles when first appearing are minute points filled with a colorless fluid, which soon becomes opaque, and in scrofulous subjects, rapidly changes to pus and forms pustules. The number of vesicles varies; in some cases they are very numerous, while in others they are scarce. They are generally isolated, irregular in size, are somewhat elevated above the surrounding skin, and are sometimes intermixed with the eruptions of intertrigo, psoriasis and lichen. They frequently are ruptured spontaneously, but more often by scratching; and from their exuded contents small thin scabs are formed. Sometimes the scratching is so severe as to cause bleeding, and when such is the case, the scabs are thick and black. There is a particular preference shown by the scari for the thin portions of the skin, such as is between the fingers and toes, covering the ano-genital region, on the inner aspect of the thighs and arms, and on the backs

of the hands and feet. As it is communicated by contact from one child or person to another, the first symptoms will be noticed on the part so exposed; and this site varies with the age of the children. In infants, the thighs and buttocks, from the frequency with which they are handled, are usually the starting point; while in older children and those old enough to wear long night clothes, the wrists, fingers and ankles suffer the onset, and from these sites it is quickly spread by scratching and friction.

The intense nightly itching sets up various irritations in the affected child, principal among which are sleeplessness and digestive disturbances, with their long train of sympathetic symptoms; but these generally disappear very quickly when the cause has been removed. As before stated, scabies is very amenable to treatment, but from improper food, lack of cleanliness, careless treatment, etc., the disease may continue indefinitely, setting up symptoms which eventually become chronic, leaving the system in a condition susceptible to the attacks of various diseases, and which, from the weakened condition, may rapidly carry the little one to the grave.

Diagnosis.—As the acarus is the cause of this disease, then, naturally, the presence of this parasite, its burrow, or other evidences of its presence, will be the diagnostic symptoms, but frequently, from the scratch marks, these characteristics cannot be detected, and from its resemblance to various other skin diseases, the diagnosis is exceedingly difficult.

According to Kippax, the following symptoms, where they can be found, will be sufficient to differentiate scabies from the other eruptions which it may resemble:

"1. The presence of cuniculi with their contained acari.

"2. The seat of the eruption, which is mostly in the interdigits and wrists, and in the flexures of the body, the buttocks and the dorsal surface of the penis. Scabies seldom appears above the nipple line.

"3. The multiformity of the eruption.

"4. The itching, which, though continuing during the day, is characteristically worse at night.

"5. The evidence of contagion in the household, other members of the family being affected.

"6. The rapid disappearance of the symptoms under parasiticidal treatment."

Prognosis.—Scabies, in itself, is a mild disease and has no severe constitutional symptoms, and through an improper diagnosis it may be prolonged for years, but when correctly diagnosed the prognosis is always good, as it yields so readily to treatment.

Treatment.—As the disease is of parasitical origin, the best treatment would be that which would destroy these parasites the quickest, and do the least harm to the patient. According to M. Gras, who has experimented for years with the acarus, it is killed

When immersed in vinegar in 20 minutes.
When immersed in alcohol in 20 minutes.
When immersed in turpentine in 9 minutes.
When immersed in potass. iod. in 4–6 minutes.

It will be seen from the above table that turpentine and potash are particularly destructive to this pest and hence their use in the treatment will be followed by prompt results. Besides these two remedies, sulphur also stands high as an antiparasiticide. These substances are to be used in the form of an unguent, care being taken to vary their strength according to the extent of surface over which they are to be spread.

Before applying, the child is to have a warm bath, and a thorough scrubbing with soap in order to remove all possible dirt, scabs, scales and other debris, and soften the skin. Then apply the ointment, wrap the child up well and put it to bed. In the morning another bath should be given, and at night again a third bath and another rubbing with the ointment. Two or three applications are usually sufficient to effect a cure. They should be kept up until all itching has ceased. All the clothing and bedding used by the patient should be carefully sterilized or fumigated before they are used again.

The sulphur may be used as strong as 100 grains to the ounce of vaselin for children over five years, while younger children should have from 60 grains down. The turpentine 15 to 20 drops, decreasing the strength for youth and extent of surface, while the potash is to vary from 5 to 20 grains per ounce. A solution of 1 per cent. *carbolic acid* or *bi-chlorid* of mercury 1-5000, is very effective, being highly destructive to the acarus and harmless to the patient. The *bi-chlorid* should not be used too freely in the very young. In small children balsam of Peru will prove an efficient application.

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